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Telephony

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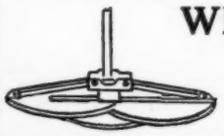

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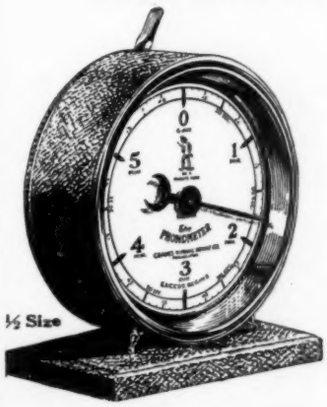

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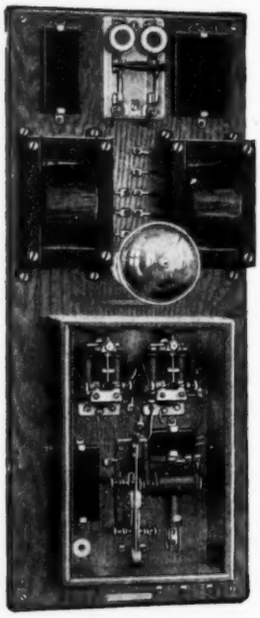

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves.

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By the Way—

July 31, 1918, is a date that telegraph and telephone men will remember.

On that day operation of the wire systems of the country by private ownership ceased and government control and operation began.

It is an interesting coincidence that July 31, 1868—50 years ago—the telegraph system of Great Britain passed into the hands of the British government and was turned over to the postoffice department for operation.

Postmaster-General Burleson is apparently speeding up matters as regards obtaining data upon which to base the government's policies in dealing with and operating the various telephone and telegraph properties. He has several committees at work and the results of their labor should be announced shortly.

Keep Going.

We hear, now and then, complaints from business men that "it is mighty hard work to do business these war times." These growls are not so numerous, nor are they really bitter, for the average American has courage and fortitude, knows that the country has a man-sized job to perform, and he is determined to see it through. It is natural, however, to contrast today with the easy, liberal times of, say, five years ago, before the government enforced rules born of the rigors of war.

And yet, how fortunate are we in the good old United States compared to those in foreign lands. Take England, for instance. Living on a small island, which needs constant and uninterrupted large imports to keep many of its activities moving, its people have been threatened for four years with strangling by the submarine menace. Happily, that peril is now generally conceded to be averted.

Meantime, however, the British business man has not "laid off" till after the war. For example, take the automobile industry. No gasoline or oil is native to the British Isles. Every drop has to be shipped in from other lands, and, of course, the demand for war purposes has been multiplied many fold. This has produced a shortage which has seriously handicapped automobile owners. At the same time far-sighted manufacturers have kept up their advertising, knowing they will reap the benefits after the war.

"Business as usual" was modified in England, so that the slogan did not apply until all war needs were met. The same is true, to an extent in this country. After our government has been supplied all the coal, steel, food, supplies and man power it needs, our business should go on as usual. Certainly it would be unwise, both from the standpoint of American business and that of the government as well, to remain dormant because of unwonted conditions.

As President Wilson himself says: "In these times commercial organizations should not decrease their activities. On the other hand, they should continue to work along their usual lines, and, if possible, increase their activities and spheres of influence. There is greater need now than ever before for co-operative activity and systematized organizations in commerce."

In this connection it is well to emphasize the importance of the United States Independent Telephone Association as an aid to co-operative action by operating telephone companies. Not only can the association materially help these companies, but the assistance rendered in that quarter will also help the government.

The federal authorities can utilize this active organization to good purpose in connection with the new relations now existing, and the association long ago proved its value to its member companies. Both the government and the operating plants should give the United States Independent Telephone Association scope for its undoubted mission in the telephone field.

Hits with Either Hand.

The boomerang is a weapon that one skilled in its use throws away from the object he intends to hit. Printer's Ink speaks of the puzzled Irishman who never could understand how a man could blow on his coffee to cool it and blow on his fingers to warm them, "and with the same breath, be jabers!"

Everybody knows that the surest, quickest way to obtain a thing is to advertise.

Over in England they are using advertising for the boomerang effect. Public utilities like gas and electric companies, which used to advertise to *increase* their business, are now advertising to *reduce* the consumption of their products.

The conservation of coal and labor for the war makes it desirable to keep down the use of gas and electric current, and these utilities are therefore resorting to advertising as the most effective means of inducing patriotic householders to practice economy in this direction. Their efforts are producing very helpful results.

In this country, telephone companies have used advertising space for the purpose of reducing traffic loads. Appeals of various kinds have been made to conserve telephone service by eliminating non-essential calls, reducing the lengths of conversation, and refraining from asking "Information" questions which can be answered by reference to the directory.

Apparently the way to change a national habit is to advertise, and then if the new habit proves undesirable, change it again by more advertising. Our own government has found advertising space most effective in pushing the sale of Liberty bonds and thrift stamps and in promoting other war activities.

The English experience shows how broad and varied are the uses to which the art of advertising can be applied. It "catches 'em going and coming."

Questionnaire Sent to Companies

Postmaster-General Burleson Seeks Information From Telegraph and Telephone Companies Regarding a Basis for Just Compensation to Companies Taken Over by the Government—Reports and Opinions on Government Activities

Goverment officials in charge of the telephone and telegraph business are at work seeking a basis for compensation to be paid the companies whose properties are to be under federal operation during the war.

Postmaster-General Burleson has sent out a questionnaire to classes A, B and C telephone companies and the telegraph corporations, calling for information as to their revenues and expenses for July 1, 1914, to June 30, 1918.

The companies are asked the question: "What basis, in your opinion, should be used in determining just compensation for your company?" Other information is requested regarding fixed capital, capital stock and funded debt outstanding July 1, 1918.

The official statement issued by postoffice department follows:

"To assist in determining the compensation to the telegraph and telephone companies taken over by the government, Postmaster-General Burleson has sent to each telephone company and each telegraph company, a questionnaire prepared by the Interstate Commerce Commission at the request of the postoffice department.

The act authorizing the President to take possession and assume control of the telegraph and telephone systems provides that just compensation to the companies shall be determined by the President. The telegraph and telephone committee which is engaged in determining a basis of compensation will make use of the information procured through these questionnaires before reporting on the subject.

Details of Inquiry.

"The inquiry made of telegraph companies is as to operating revenues and operating expenses during the last six months of 1914, during the years 1915, 1916 and 1917, and the six months ending June 30, 1918; and the estimated operating revenues and expenses for the year ending June 30, 1919.

Covering the same period, information is sought as to telegraph and cable operating revenues, uncollectible operating revenues, taxes assignable to operations, deductions from net operating revenues, operating income, income from lease of plant, rent from lease of plant, miscellaneous rents in connection with telegraph and cable operations only; net interest on its debt, other interest deductions, dividend appropriations of income, dividend appropriations of surplus plant and equipment installed (net); total revenues from telegraph transmission, total revenues for cable transmission, total non-transmission revenues, contract revenues; and amount of depreciation charged to operating expense account.

Basis of Compensation.

"The companies are asked what basis should be used in determining just compensation, and what factors have been used in reaching conclusions in answer to this question. Full information on the subject is requested.

'Are the conditions such under your company management' is asked, 'keeping particularly in mind the present and prospective cost of labor and materials, that the estimated net earnings for the year beginning July 1, 1918, will be sufficient to cover the compensation,' etc. If this is not the case, the company is requested to state fully what increase in revenue is considered necessary to put the company on such a basis, and it is stated that estimates for operating expenses should be shown in budget form.

The companies are further required to state total investment in plant and equipment, capital stock outstanding, funded debt outstanding, amount of other interest-bearing securities outstanding, number of offices, miles of pole lines, miles of copper wire, and miles of iron wire.

"The companies are instructed that answers should be complete; and full information as to the reasons for conclusions presented, as well as detailed information as to the records or conditions, which in the opinion of the reporting officer justify the conclusions.

The questionnaires are in a form blank to be filled out by each company and sworn to. The questionnaires addressed to telephone companies are similar in form, differing in the character of questions only insofar as the character of the service differs."

Opinion of Association Directors.

Vice-President F. B. MacKinnon of the United States Independent Telephone Association, has sent to all member companies the opinion of the board of directors relative to compensation (which was printed in last week's issue of TELEPHONY), accompanying which is the following notice, referring to the Postmaster-General's questionnaire:

"Washington, August 24, 1918.

To All Members:

Enclosed is a copy of the opinion of the board of directors of this association relative to a basis of compensation to be used by the government in paying the owners of the telephone properties for the use of those properties while they are under government control.

This opinion was formally expressed by the board of directors at a meeting of the board held in Chicago, August 17. Your are requested to give it earnest consideration before expressing an opinion as to the compensation that will be satisfactory to you for the use of your property.

A questionnaire has been sent out by Postmaster-General Burleson to Classes A, B, and C telephone companies which calls for information as to the revenues and expenses of those companies from

July 1, 1914, to June 30, 1918, and an estimate for the year ending June 30, 1919. The question is also asked, 'What basis, in your opinion, should be used in determining just compensation for your company?' Information is also asked as to investment in fixed capital, capital stock and funded debt outstanding July 1, 1918. Any Class A, B, or C company not receiving a copy of this questionnaire should notify this office to that effect at once.

The Postmaster-General asks that acknowledgment of receipt of the questionnaire be made on the card enclosed for that purpose. We would suggest that you be sure to comply with this request promptly.

Members are requested to file their answers through the association's Washington office. By so doing, you will enable the association to be of assistance to you and to the government, as we can check the answers carefully and make sure that all questions are understood by you and answered fully."

It seems to be the consensus of opinion that the federal authorities will not announce many changes until they and the companies concerned have reached an agreement on compensation. Of course, Washington has received a report of the Independent telephone meeting held in Chicago, and Postmaster-General Burleson and his aids, Messrs. Lewis, Lamar and Koons, know the attitude of the association members and directors as reflected in the resolution adopted at that time.

So far the government committee has not indicated how it views that position. Until the companies file their answers to the questionnaire, probably no statement will be made as to how the government representatives regard the Chicago resolution.

A semi-official statement appeared in the press to the effect that the postoffice department denied a report that a general raise in telegraph and telephone rates is contemplated by the government. It is known that pressure is being brought to bear to raise wages among telephone employes, and as telegraph employes have been granted an increase, it is reasonable to suppose that the former will not be denied very long.

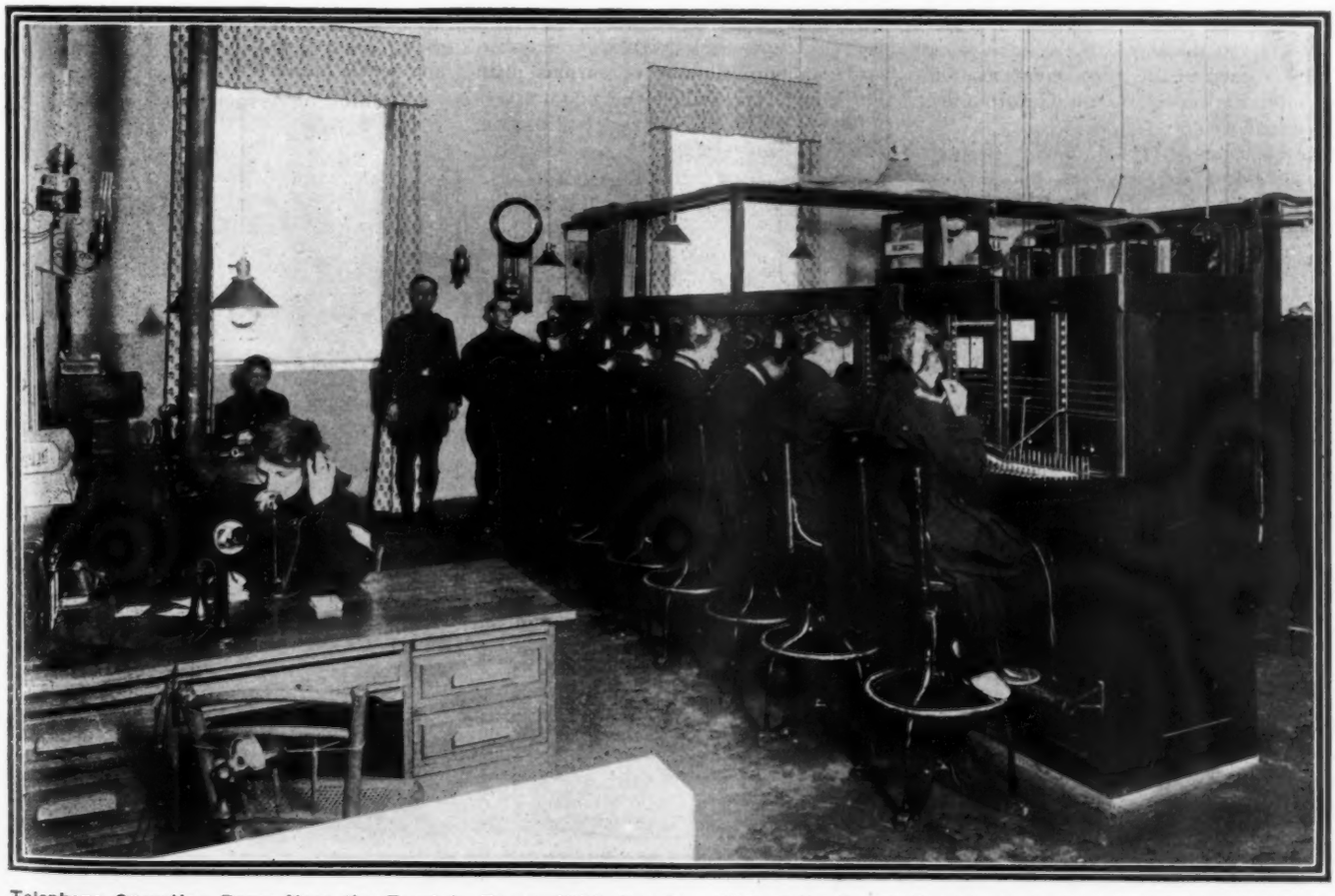
That this will lead to a raise in rates also is considered logical. It will not be forgotten, either, that passenger and freight rates on the railroads were elevated to make it possible to raise the pay of railroad employes.

In this connection, a news dispatch from TELEPHONY's correspondent at Lincoln, Neb., has added significance. He says:

"It has been intimated to the Nebraska State Railway Commission, although no direct communication has been received from the government department of telephones and telegraphs, that the entire matter of rate regulation will be left in the hands of the state commissioners. The trouble that the federal railroad administration got into with the state commissions over the question of the state rates being made from Washington, is understood to have been carefully noted by Mr. Burleson and his aids, and they will profit by the experience of Mr. McAdoo and his staff.

Commissioner Taylor of the Nebraska board has just returned from Washington, where he conferred on express matters with ex-Commissioner Prouty, who represents the interests of the shippers, but he had no direct communication with any member of the telephone administration. The gossip in Washington is that as soon as the survey now being made is concluded, special attention will be devoted to the question of wages for operators and other employes. The companies are represented to have been having a difficult time filling the large number of places left vacant by enlistments in the signal corps and other departments of the army and navy, and also in securing enough operators to give the service desired. The better wages offered women in other lines through their being used to replace men, have been a source of constant drain upon the operating forces.

It is understood that if the department



Telephone Operating Room Near the Front in France With American Girls at the Board—Captain W. S. Vivian, Secretary-Treasurer of the United States Independent Telephone Association, May be Seen Standing Against the Wall Near the Center of the Picture.

at Washington finds it desirable and necessary to frame a wage schedule for the various-sized exchanges, it will communicate its findings and recommendations to the state commissions so that they may apply them and at the same time provide the necessary additional revenue where this is found to be necessary.

Many of the smaller exchanges in Nebraska pay small wages to operators largely because of the limited net revenue produced by the plants, and an addition of $5 a month even to the wages of two operators would mean the company would go into the red column of the ledger."

The report that the federal authorities will leave most rate-making problems to the various state commissions corroborates the impression obtained by most men who have looked into this phase of the situation. It is argued that the administration naturally desires to have its period of government control of the wires a success, and it realizes equally well that a general raise in rates, if ordered by Washington, would arouse adverse criticism in many quarters.

If the increased cost of telephone service is ordered by the respective state commissions, however, the blame will not cling quite so closely to the federal management. At the same time, it is universally considered wise to let the local authorities fix local rates, with the government standing by to see that no glaring injustices are done.

With regard to the government control and rates in Nebraska, our Lincoln correspondent writes:

"If the financial records of the several hundred telephone companies that report to Nebraska State Railway commission are any criterion of conditions generally, the government telephone and telegraph administration will discover that it has taken over the telephone systems of the country at the most inopportune time for it to demonstrate the value of public control.

Secretary Browne of that commission says that in the last year over 25 companies have been granted increases in rates and that as many more applications are now pending. Requests for additional rates have been filed recently at the average rate of one a week. Correspondence had with other companies indicates that a number of others are facing similar action.

Some of the companies are very reluctant to embark on a campaign for increased rates, because of the friction and trouble with patrons, there being usually a small proportion that are irreconcilably opposed to any public utility being given any higher rates and make a fuss out of all proportion to their number. In a few instances, rates collected were those named in franchises secured a dozen or so years ago, and few communities have been educated to understand that under regulation by the state, franchise rates are binding on neither patron nor company.

The greatest Independent development in the state occurred some ten or twelve years ago. The refusal or inability of the Bell to furnish service as rapidly as the demand developed, made necessary the organization of Home companies and their financing locally. Very few of the men in control were sufficiently familiar with the business to understand the necessity of setting aside a depreciation fund, and in most instances, this has been paid out in dividends that it is impossible to secure the return of in order to rebuild the plants, a period just now being reached with many of them.

The larger Independent companies have been besieged for the past year by stockholders of smaller companies who desire to sell out because of the financial condition of the companies. Where excessive dividends have been paid, the commission is inclined to rule that dividend-paying be suspended and this makes it difficult to dispose of any additional stock needed to finance the rebuilding operations.

At least one large Independent company that has operated at a deficit for the last six months and which has lately been compelled to increase wages in order to hold men and operators, has decided to wait until after the war ends before asking for higher rates, depending upon the commission to provide revenue at that time to take care of the dividends now being foregone."

Settling a mooted question as to what authority shall regulate telephone rates in states in which there is no railroad or public utilities commission having this power. now that wire service is under government control, Postmaster-General Burleson recently telegraphed the Texarkana (Texas) city attorney as follows:

"City councils may take action relative to telephone rates. The matter should be submitted to this department for final approval."

The telegram was in answer to a request for information following the passage of an ordinance granting increased rates.

TELEPHONY's mail daily reveals the keen interest felt by telephone men all over the country in the government policy with regard to wire communication. The American press is also keeping a close watch on developments, and is making a great deal of comment on the question. In the near future the trend of public opinion, as reflected in the newspapers will be described in these columns. This opinion, so far, has accepted government control of the telephone as a war measure, but there are many outspoken declarations against government ownership after the war.

The Commercial Telegraphers Union of America, whose threat to strike is said to have led the government to take over the wire business, has declared for government ownership. At a meeting held in New York, August 25, President Kovenkamp said: "Our mission is to see that government control is turned into government ownership."

U. S. Army Linemen Work Under Fire on War Front.

In a special cable dispatch to the Chicago Daily News, Junius B. Wood tells something of Signal Corps work on the fighting front. Says Mr. Wood:

"When the other men of his battery had the picturesque duty of firing the big guns in the training camps, Corporal John Cewsert of Tarpen Springs, Fla., had the prosaic work of stringing telephone wires. He had the same job when the artillery unit to which he belonged came to the front and opposite Belleau wood he was still stringing wires, which then required the sternest kind of soldierly qualities.

The first night he went out with a party under Lieut. John Cremelin, of New York, to run a wire from the battery emplacement in the rear to an observation post forward. The machine gun fire was heavy and he sought shelter in the infantry headquarters nearby. The next morning, not finding the others, Cewsert resumed the work single handed.

Except for occasional aid from passing 'leathernecks,' he ran a heavy metallic circuit four kilometers (2.4 miles) through Lucy-Lebecage without being seriously hindered by the widely distributed shellfire. Then his supply of wire ran out. He returned three kilometers (1.8 miles) and carried a heavy reel of wire through the shelled village and completed the circuit over open territory, establishing communication between the front line and the rear batteries.

Quick telephone communication is essential to instantaneous co-operation between the artillery and the infantry and for that reason the linemen are out stringing new wires or splicing cuts whenever the shelling starts. Lieut. Louis F. Hall of Ann Arbor, Mich.; Lieut. Leonard Cochent of New York; Corporal Jacob S. Hutt of Jeffersonville, Ind., and Private John Orr of Dryden, Va., were under almost constant shelling for 24 hours, while maintaining the line through the same village.

The line was cut twice and each time the corporal and the private traced the break, though gas as well as high explosive shells were being thrown, and repaired it in the midst of this rain of death. Their own ammunition dump was fired by an exploding shell and a big stretch of the line which had been wiped out was restored by these men."

Costs of Special Service and Plant

Additions to Plant and Maintenance of Plant and Equipment and Their Overhead Expenses Part of the Costs of Manufacturing Special Service and Plant—Estimating Revenues for Profitable Extensions

By Ward H. Snook

The primary object of a telephone company is to manufacture service and to market it at a profit. In order to keep up with the demand for its service, the company is constantly compelled to manufacture additional plant, as well as service. In other words, there are additions to plant, and maintenance of plant and equipment, together with certain general or overhead items of expense incident to the business. Hence additions to plant service, regular and special, ought to carry their share of the general or overhead costs.

The cost of producing any manufactured or fabricated article comprises the direct costs of material, labor and supervision, plus the indirect costs of maintaining plant, tools and organization for the production and distribution of the product. These indirect costs are usually termed "overhead expenses." It is often profitable to divide and subdivide the direct and indirect expenses depending on the product, organization and quantity produced.

The overhead expenses may be divided into three general classes: Manufacturing, General, and Sales.

First, the cost of operating and manufacturing tools and equipment, together with supervision should be classed as Manufacturing overhead.

Second, the management and supervision of the organization as a whole, together with the general expenses, should be classed as General overhead.

Third, the cost of marketing the product or the cost of selling the product, is the Sales expense.

Referring to the table, which is a recapitulation of certain accounts for Class A and B telephone companies, as specified by the Interstate Commerce Commission, the overhead costs as applied to telephone accounts may be picked out.

Account 101, Additions to Plant, contains all labor and material that have gone into the production or manufacture of new plant. Section I, Maintenance Expense, and section II, Traffic Expense, include all the direct labor and material expenses that maintain and manufacture telephone service. The summation of Maintenance, Traffic and Additions give the total direct or productive manufacturing costs.

Such portion of the clearing accounts (700) as are not directly chargeable to certain jobs or accounts, should be distributed by taking the ratio of their sum, or total, to that of the total direct or productive costs. This ratio may be expressed as a percentage and termed the "manufacturing overhead."

The general expenses (section IV) should be summed up and their total divided by the direct manufacturing costs. This, expressed in percentage, is the general overhead.

Commercial expenses (section III) are the costs of selling the service or sales expense. Their sum, expressed in percentage of direct costs, is the selling burden or overhead.

With reference to the table for Class C companies, the accounts are not subdivided to so great an extent as those of the Class A and B companies. The direct labor and material expense accounts are: 600. Repairs to wire plant; 610. Repairs to equipment; 620. Station removals and charges; 650. Operators' wages; 660. Other traffic expenses. If we add to these accounts, the additions to plant and equipment, we have the total of the direct labor and material costs.

In order to make these repairs and additions, we have made certain general repairs, account 640. There have been other office and general expenses, ac-

Productive Labor and Material.....		101 Additions to Plant for Year.
	Service	I. Maintenance Expenses:
		601. Supervision of maintenance.
		602. Repair of aerial plant.
		603. Repairs of underground plant.
		604. Repairs of central office equipment.
		605. Repairs of station equipment.
		606. Repairs of buildings and grounds.
		607. Station removals and changes.
		608. Depreciation of plant and equipment.
		609. Extraordinary depreciation.
		610. Other maintenance expenses.
		611. Repairs charged to reserves—Cr.
		II. Traffic Expenses:
		620. Central office superintendence.
		621. Traffic superintendence.
		622. Service inspection.
		623. Clerical operating wages.
		624. Operator's wages.
		625. Central office supplies and expenses.
		626. Rest and lunch rooms.
		627. Operators' schooling.
		628. Transmission power.
		629. Central office stationery and printing.
		630. Messenger service.
		631. Miscellaneous central office expenses.
		632. Pay station expenses.
		633. Other traffic expenses.
Sales Expense		III. Commercial Expenses:
		640. Commercial administration.
		641. Promotion expenses.
		642. Advertising.
		643. Canvassing.
		644. Sublicensee relations.
		645. Collection expenses.
		646. Revenue accounting.
		647. Revenue collecting.
		648. Pay station commissions.
		649. Directory expenses.
		650. Other commercial expenses.
General Expense		IV. General and Miscellaneous Expenses:
		660. General office salaries.
		661. Salaries of general officers.
		662. Salaries of general office clerks.
		663. General office supplies and expenses.
		664. Expenses of general officers and clerks.
		665. General office stationery and printing.
		666. Other general office supplies and expenses.
		667. General law expenses.
		668. Insurance.
		669. Accidents and damages.
		670. Law expenses connected with damages.
		671. Miscellaneous general expenses.
		672. Relief department.
		673. Telephone franchise requirements.
		674. Amortization of franchises and patents.
		675. Other general expenses.
		676. Telephone franchise requirements—Cr.
Manufacturing Expense		Clearing Accounts:
		701. Shop expense.
		702. Stable and garage expense.
		703. Tool expense.
		704. Supply expense.
		705. Engineering expense.
		706. Plant supervision expense.
		707. House service expense.

Recapitulation of Accounts for Class A and B Telephone Companies.

counts 670 and 680, together with a part of interest and taxes. By dividing the general overhead expenses by the direct labor and material expense, the overhead factor is obtained.

In order to arrive at the true manufacturing cost of an addition, or special

Productive Labor and Material.	101 additions to plant Operating Expense: 600. Repairs to wire plant. 610. Repairs to equipment. 620. Station removals and changes. 630. Depreciation of plant and equip. 650. Operators' wages. 660. Other traffic expenses.
Overhead Expense.	640. Other maintenance expenses. 670. General office salaries. 680. Other general expenses. Part of interest and taxes.

Overhead as Applied to Class C Telephone Companies.

work or service, an amount equal to the product of the overhead factor and the direct cost should be added to the direct cost. This will give the true or total manufacturing cost.

In order to obtain the true cost of any item of service, or plant extension, to the direct cost should be added the proper percentage for manufacturing, general and sales overhead expenses.

Manufacturing Special Service.

All miscellaneous construction work, or special service undertaken for subscribers or other companies, should pay, at least, all direct labor and material cost and its portion of the overhead. Besides this, it ought to have a profit sufficient to pay its share of the interest on investment.

If such work will not bear its share of overhead, the assets of the company are being dissipated. If it will not bear its share of the interest on the investment, such work should be avoided if possible, for it only interferes with, and prevents, the performance of profitable work.

This is a most serious cause of profit leakage and should be watched closely.

If some special service or outside operation is performed for another company, or a patron, to the direct and overhead costs should be added a profit sufficient to make the operation bring in a fair profit. If 8 per cent is the proper return, then 8 per cent of the total expense turnover expressed in percentage of direct manufacturing costs, will be the perecntage to add to direct costs for profit. If the direct labor and material cost is $16,000, and the expense turn-over is $20,000 a year, 8 percent of this is $1,600, and $1,600 is 10 percent of direct costs.

Supposing some other company wanted a line repaired and the direct labor and material cost was $40, and if all overhead amounted to 35 per cent, then 35 per cent should be added for overhead, and if 8 percent of total expenses divided by total productive labor is, say 10 per cent, then the proper charge for this work is 40 times 1.45 or $58.

It is important to remember that overhead costs are real costs and that for every dollar of direct expense there is from 25 cents to 50 cents of indirect expense that must be paid. If it isn't paid by the beneficiary, the operating company is making a donation. If the operating company fails to collect a reasonable profit, it is engaged in pure philanthropy.

Profitable Extensions.

In order to estimate whether an extension will be profitable or not and knowing the annual expenses and the income necessary to render the property profitable, the ratio of this income to assets expressed in percentage gives a fairly accurate index of the yearly rental or revenue that must be obtained from the extension.

Supposing the ratio of profitable income to total assets is 4/10ths, then for every dollar put in new work, there would have to be a yearly return of at least 40 cents, so that if a prospective patron is to pay $15 a year rent, the company could afford to invest not more than 15÷.4 or $37.50 to attach the business, and that only for permanent business. The $37.50 should include overhead. In other words, if total overhead costs amounted to 35 per cent of direct costs, no more than $37.50÷1.35, or $27.80, should be spent on the extension.

The reader may not altogether agree with the writer in his method of arriving at the overhead charges, or his method of determining whether an extension will be profitable. However, undistributed expense is a real factor in every business and has gone entirely too long unnoticed in the telephone business. Some logical method of calculation and distribution ought to be applied to all special service and all extensions should be analyzed to see if they will be profitable.

If this is done, we will not have to answer the question—What became of the profit we ought to have?

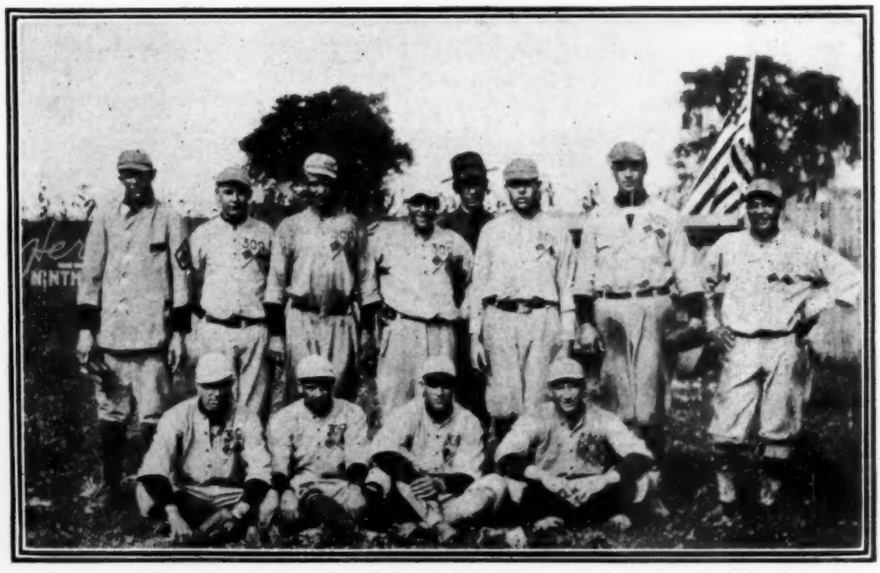
Field Signal Battalion Baseball Team "Champs" of Camp.

"All work and no play makes Jack a dull boy" is an old saying which is generally held to be true. Even in wartime we hear of thousands of dollars being spent to provide amusement and recreation for the men in our armies both in this country and abroad.

Baseball, the national pastime, is easily the leading recreation during the summer months. At Camp Sherman, Ohio, the baseball team of the 309th Field Signal Battalion became the "champs" of the camp. It defeated the various teams at Camp Sherman and in addition teams from Portsmouth and Ironton, Ohio, and Huntington, W. Va., winning eight out of ten games played.

The team is made up of men formerly in the employ of the Tri-State Telephone & Telegraph Co., the Indianapolis Telephone Co., and the Central Home Telephone & Telegraph Co.

The accompanying illustration shows the team. The names of the players and their positions are: Goheen, catcher; Stanley, pitcher; Mace, first base; Bowman, second base; Anderson, shortstop; Paine, third base; White, right field; Leach, center field, and Brown, left field. Exactly "who is who" in the photograph will have to be left to the individual reader. Far be it from us to fit nine names to 12 persons—that would be some stunt.



Champion Baseball Team of 309th Field Signal Battalion, Camp Sherman, Ohio.

Central Office Ringing Equipment

Ringing Machines and Interrupters—Their Operation—Equipment Developed to Signal Subscriber—Telephone Ringer and Its Operation—Practical Explanation of Electrical Theory of Central Office Ringing—Second Installment

By P. A. Price

As alternating current was first employed for ringing current, it might be well to first see how it is produced, and what it is.

In Fig. 3-*B* the essentials of a simple electromagnetic generator are shown. The permanent magnet, *M*, is bolted to pole pieces, *P* and *P'*, which almost encircle the armature, *A*. In the deep slot of the armature is wound a coil of wire, *W*, the ends, *T* and *T'*, of which are connected with the rings, *C* and *C'*, mounted on the same shaft which carries the armature, and allows it to revolve in the field of the magnet.

The magnet has a north and a south pole, and between them in the space occupied by the armature, is a magnetic field filled with the "lines of force" which radiate in and about magnetic substances, and pass from one pole of the magnet to the other. When a coil of wire, as in Fig. 3-*A* is turned about in a magnetic field, a current of electricity is induced in the coil. When the coil is wound about an iron core as in the case of the armature, *A*, of Fig. 3-*B*, the current is greatly amplified over the amount induced in the simple coil shown in Fig. 3-*A*. When the winding is made up of a great number of turns, the amount of current is still further increased.

In contact with the rings, *C* and *C'*, are two brushes, or collectors, *B* and *B'*, and from them leads are taken to the switchboard and to a "grounded" bus bar connection, respectively.

When the armature is revolved in the direction of the arrow, the winding will be brought more and more directly into the field of force, and when the slot is one-quarter of the way around, the layers of the winding will intersect or "cut" the lines of force at a right angle. An electric current is being produced in the winding as soon as it begins to enter the magnetic field, and reaches its maximum strength at the completion of this quarter-turn.

As the revolution continues, the current will decrease in intensity until at the point of a half-turn of the armature, the current reaches a zero point. This current, we will say, is of + polarity, and its maximum voltage is, say, 80 volts. The revolution continues and the winding is being brought into the field of force about the *S* pole of the magnet. A current is also produced, but is of opposite polarity to that induced before, and is of — polarity, but as the strength of the field is the same, it will have the same maximum value of 80 volts.

A complete reversal of current polarity is thus produced by every complete turn of the armature. A graphic representation of the nature of this current is shown in Fig. 4-*A*. The zero point marks the inception and completion of every half-wave, or "half-cycle," as it is called, the complete reversal of the current being accomplished in a full "cycle" which, in a two-pole generator, means one complete revolution of the armature.

If the armature is revolved at the rate of 960 times a minute, there will be 16 complete revolutions every second, and the current is said to be "16-cycle" current, which is the "frequency" generally employed for ringing current, except as will be noted later.

With a ringer of the construction we have been considering, there is a limit to the speed with which the armature may be expected to vibrate satisfactorily when carrying the tapper for the gongs. If the frequency is too high, the interval between impulses is not sufficient to allow the inertia of the moving parts to be overcome, and the armature will tend to stick to one core or the other. The result will be more of a "buzz" than a distinct ring. It has been found that a frequency of over 25 cycles is unsuitable for this type of ringer construction.

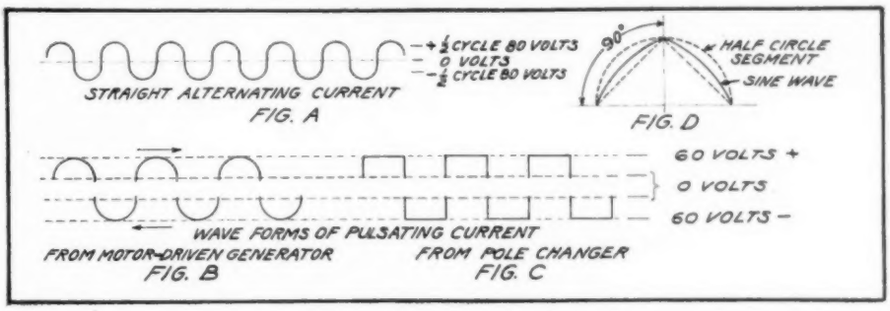


Fig. 4. Varieties of Ringing Current.

Referring again to Fig. 3-*B* we notice that on the shaft with the two rings, *C* and *C'*, is a split ring, *D*, to which the winding terminals, *T* and *T'*, are also connected. This split ring is called a "commutator," and its function is to allow the production of the pulsating current which we have seen to be also employed for ringing purposes. The action of the commutator is as follows:

As the induced current in the armature rises from zero to 80 volts +, it is brought to the segment, *S*, as well as to the collector ring, *B*. The brush in contact with this segment will begin to carry off + current from its inception and rise to the time of its decrease to zero again. But at this point the segment leaves the + brush contact, and is under the — brush, and at this time the winding is producing — current from its proximity to the opposite pole of the magnet. The — brush is consequently taking off — current, and no current is being given to the + brush until the revolving armature has made another half turn, when + current is again produced and taken off by the + brush.

There is then an alternate production of + and — current from the two brush-

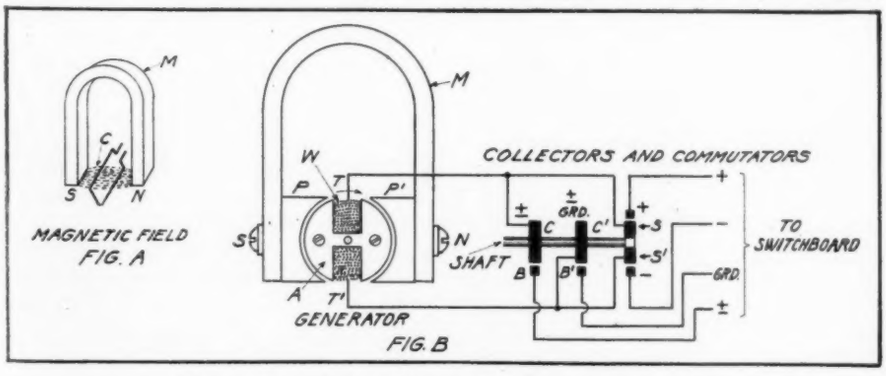


Fig. 3. Essentials of the Ringing Current Generator.

es, but the commutator prevents this flow from being merged into an alternating wave by providing an interruption at the point of merging, or at the point of zero voltage. In consequence, one brush will always give off one polarity, and the other brush the opposite polarity in distinct waves or impulses, punctuated by the time interval necessary for a half revolution of the armature.

As one of the brushes, *B'*, of the collector ring, *C'*, is grounded, it will place a ground on one terminal of the winding at all times, and this ground will be either + or — depending on the polarity of the current at the particular stage of its revolution. With the current flowing out on the + brush, the ground will be on the — wave of the current; with current flowing out on the — brush, the ground will be on the + wave. Consequently, current sent out from either brush to a bell will always be able to complete its circuit to the machine from the ground on the side of the bell at the subscriber's station.

The time interval punctuating the waves of pulsating current is exactly what is required to be available as ringing current. Were there several windings upon the armature and a commutator segment for each winding, the result would be a current which would not decrease to a zero voltage, because it would be taken off by the brushes before it had the opportunity of decreasing.

Such a current sent through the ringer coils would cause the armature to "stick" to one core or the other and it would vibrate hardly at all. Even with the distinct pulsations produced by a two-segment commutator, the armature's movements must be assisted by the biasing spring, but this is because the polarity of the cores does not alternate, and the armature's ends are not drawn first to one and then to the other core.

In Fig. 4-*B* we have a graphic of the pulsating current waves, showing them to consist of half-cycles rising from zero to a maximum and decreasing to almost zero again. As we have seen, the commutator comes into play at the proper moment and interrupts the reversal which would obtain otherwise. The wave forms shown in Fig. 4-*C* are also of pulsating current, but of pulsating current produced from a pole changer, which will be spoken of later. The difference in form of the two waves is noteworthy, and may be explained at this time.

The current wave produced by a revolving armature in a magnetic field is built up by the generating winding being brought into and across the lines of force of a magnetic field. As the winding cuts deeper and deeper into the lines of force, the current being generated thereby rises to its full value in a geometric form, which simulates the rise of a curved line designed to be segment or arc of a quarter-circle, or of a 90-degree angle. And with the maximum point attained, it begins to decrease to zero along a similar path.

This path, ascending or decreasing, is not exactly that of a circle segment, and may be more accurately described by its representation in Fig. 4-*D*. Such a curve is called a "sine wave." The wave produced by a pole changer is, as we shall see later, raised from zero to a maximum value without any gradual building up through a magnetic field of varying strength, and there is consequently no gradual growth along the line of a circle segment. It pushes up to its maximum at once, maintains this maximum during its interval of existence, and falls to zero in the same abrupt way in which it attained its maximum value.

So far we have been discussing the production of ringing current from a more or less theoretical viewpoint. In all except very small offices, and practically only in magneto subscribers' instruments, ringing machines made up of permanent magnets have been superseded by dynamotors and generators in which the permanent magnets have been replaced by electromagnets. But the principle of the production of current by a revolving armature carrying a coil of wire in a magnetic field is essentially the same.

While it would be possible to construct a permanent magnet type of ringing machine of any size, there would be no economy in so doing. The magnets are required only to produce a field, and this may be secured by electromagnets in just as satisfactory a manner, and with a very material economy of size in machines of large output. The majority of machines are designed to furnish both alternating and pulsating current, and we have seen that the same winding produces both.

The alternating current output of such a machine is usually given a higher value, as regards voltage, than the pulsating current output. For example: When the alternating current output is rated at 75 or 80 volts, the pulsating or direct current output is rated at 60 or 65. As both are produced by the same winding at the same time, an explanation is in order.

We have seen the current is produced in what is called a "sine" wave. The determination of the voltage of a sine wave is obtained by a mathematical calculation involving the sum of the voltages at different stages of the wave's formation, and of a consideration of both halves of the wave, from its inception to its positive peak, thence to its decrease to zero, rise to the peak of opposite polarity, and decrease to zero again. These readings are made with an alternating current voltmeter.

The pulsating current wave is not taken through the second half of its cycle, for it is not continuous through that half, being interrupted, as we have seen, by the commutator. At first glance, it would seem that only half the voltage value would be allowed under this circumstance, but there are other factors in the production and flow of alternating current which make a material reduction in its effective peak voltage. When all the mathematical considerations are satisfied, the values of the two outputs are substantially as given.

Such a generator of ringing current may be driven by any available source of power, providing the armature is not made to revolve at such speed as to cause a much higher frequency than 16 or 20 cycles per second. For this reason a generator driven by an alternating current motor is usually belted to the motor, rather than connected directly by shaft coupling, though direct connected sets for an alternating current drive are being offered by manufacturers. Commercial alternating current motor circuits are generally of 60 cycles, with a speed of 1,500 revolutions per minute, or higher, but by using a belt, and the proper size of pulleys, any required speed may be secured.

If the driving motor is operated from the central office battery, or other source of direct current, speed is largely a matter of operating voltage, and no such difficulties are experienced. But even here it is often necessary to make provision to keep the speed within certain limits, as we will see in a consideration of machine-ringing equipment.

On a generator using electromagnets it is necessary to energize them. The armature is consequently arranged to carry an additional winding. This is brought out to a commutator at the opposite end from that carrying the collector rings and pulsating-current commutator. This commutator is made up of quite a number of segments, that the produced current may be more continuous, and a set of brushes are provided for collecting it. These brushes may be directly connected to the field windings, or the current may be taken through a rheostat that the strength of the field may be regulated. This matter will also be discussed later.

At an early date it occurred to some one that there was no reason why a motor winding could not be placed upon the armature of a ringing machine and the machine made self-contained, taking direct current from the central office battery, or other source of direct current by a commutator and brushes at one end of the armature, and giving out

ringing current by separate rings or commutators at the other end. The result was a machine which is extensively and satisfactorily used. It is called a dynamotor.

A dynamotor is shunt-wound, as regards its motor side, and a starting box is usually required in the field winding. Such a device is essential where there is a slow-speed attachment driven by a worm gearing on the armature shaft, as the starting-current requirement of a machine so equipped is very high compared with its requirement when once in operation.

The field windings of such a machine have a double duty to perform, the driving of the armature as a motor, and of providing a field for the generator windings of the same armature for its ringing current output.

Two ringing machines are usually provided, one being operated from the commercial light and power circuit of the city, and the other from the central office battery. A comparison of the power required to operate a dynamotor against that required for a direct-connected set, both being battery driven, may be worth consideration, and will show the dynamotor to use the less. In the case of the direct-connected set, the motor must be supplied with sufficient power to operate itself at the proper speed, and also to drive the generator, while the dynamotor merely has to turn its own armature against the "drag" of the ringing current windings.

This "drag" may be heavy, as will be realized by anyone who has watched a small machine manfully trying to supply the demands of a large office at the "busy hour" of the day. There will be moments when the lead is so heavy as to slow down the machine very appreciably, or even cause the fuse of the motor circuit to blow out. It is as truly a "load" on the machine as if a brake were applied with the motor in full operation. In such cases, or if of frequent occurrence, the machine should be replaced by one of larger capacity, or an interruption of service might result at an hour when the very cause shows it to be most inopportune.

The required size, or capacity of a ringing machine is no longer left to guesswork. It has been determined that for each total of about 75,000 calls per day in a manual ringing office, the ringing machine should have a capacity of one ampere, or 75 watts, considering a ringing voltage of 75, and a similar capacity of one ampere for each total of about 37,500 calls per day in an office using automatic, or machine ringing. The reason for this double allowance of calls per day in a manual exchange, is interesting, and will be spoken of in connection with machine-ringing equipment.

In Fig. 5 the general wiring and arrangement of a ringing machine is shown. This machine may be considered as a dynamotor, with a retardation coil in the operating or driving circuit from the battery. This coil consists of a number of turns of copper wire about a core made up of iron wire.

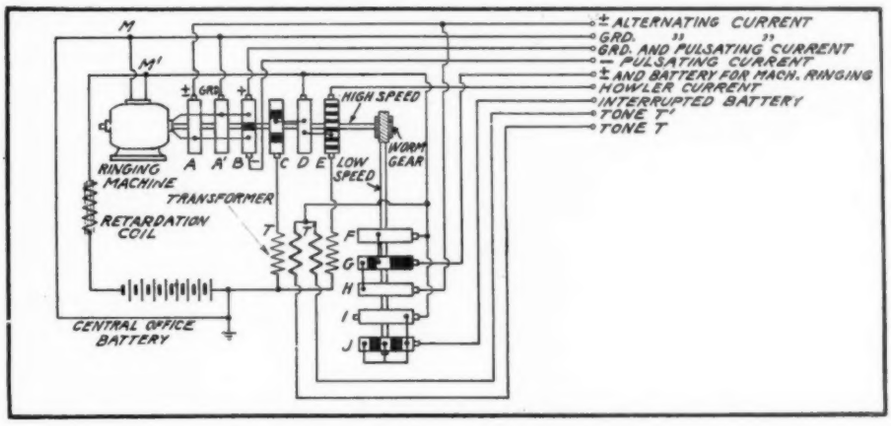


Fig. 5. Typical Wiring of Ringing Machine.

As the commutator of the motor end revolves, its segments slip beneath the brushes of the machine, and cause interruptions or disturbances in the battery circuit. With the machine operating at its normal speed, these interruptions are so rapid as to produce a decided "hum" which would affect the talking circuits of the switchboard. The core of the retarding coil absorbs these noise-producing "eddy currents," as they are called, and they do not reach the battery to any great extent.

From the other end of the machine, wires are shown attached to the two rings, *A* and *A'*, and also to the two segments of the commutator, *B*. These are the terminals of the armature winding, and give out alternating current at the rings, and pulsating current at the commutator, as we have seen from an analysis of the simple machine shown in Fig. 3-*B*. The brush on the ring, *A*, carries alternating current to the switchboard, and that of ring *A'* is connected to ground to provide a "return" for grounded bell circuits of both the alternating and pulsating ringing currents.

In a small office the ringing machine's sole function is the generation of ringing current, and unless party lines employing pulsating current in addition to alternating are in use, the two rings, *A* and *A'*, are all the machine is equipped with. In larger offices, however, or in multi-office districts, there are frequently other requirements which the ringing machine is able to provide.

The shaft of the machine of Fig. 5 is seen to terminate in a gear wheel which drives a worm-ended shaft at right angles to it. The ratio of the gearing is such that while the motor shaft may revolve at 960 revolutions per minute, the other shaft's speed is about ten per minute. The ring, *J*, on this shaft is seen to resemble a commutator in having metal segments separated by insulating material. In this case the segments are strapped together and connected to the adjacent ring, *I*, which is, in turn, connected to the "live" side of the central office battery.

With the machine in operation, a flow of interrupted battery current is thus provided for such use as may be required—to flash a lamp for a "busy" or "trouble" signal, for example. It may, of course, be connected to give an interrupted "ground" return to a circuit instead of "battery."

Such a current, interrupted at slow speed, would have little value in giving a subscriber an audible signal, say of a line being "busy"—something quick and definite is required for this purpose. Battery current from *M* (above the ringing machine) is brought to ring *D* and there strapped to the segments of ring *C* on the high-speed shaft.

These segments are rather wide, and the intervals of current flow are sufficiently long to produce a well-defined "make" and "break" in the circuit, which passes to ground through the high-resistance primary winding of the transformer, *T*. The secondary winding of this transformer is of very low resistance, and carries live "battery" to the fuse board, or other distributing point, at "Tone T."

As the battery current passes through the coil, it picks up the induction of the interrupted current in the primary winding, and may be sent out on a subscriber's line to give an audible signal of a certain condition, either that a desired line is "busy" or "in trouble." Sometimes this "tone" is carried to a low-speed interrupter ring, and broken up into special kinds of frequencies to serve special purposes.

In the ring, *E*, on the high-speed shaft, the segments are very numerous, and battery current interrupted by such means becomes an ear-splitting shriek when manifested as sound in a telephone receiver. Such high-speed inter-

rupted battery is universally called "howler current." It is used, with discretion, at the wire chief's desk to put out on a subscriber's line when the receiver has been "left off the hook."

If any one happens to be in the neighborhood of the instrument, it is almost certain their attention will be attracted to the telephone when the "howler" is "turned loose." The practice is not to be commended, as it would be quite possible to injure a subscriber's hearing if the full force of the "howler" was caught with the receiver held against the ear. Lawsuits are always disagreeable, especially when the cause is avoidable.

The "howler" current may also be sent through a transformer, as at *T'*, and the induced current derived from it used for special purposes. In a large exchange where there may be a demand for several different "tones," there will be a bank of these transformers mounted either under the ringing machine table, or on the rear of the power board. They are frequently made up of large cores of iron wire with a primary winding of several hundred ohms, and a secondary of one ohm or less. As the secondary has merely to pick up a certain kind of "noise," this low winding is sufficient.

A coil of this type produces an extensive magnetic field, sufficient to induce its particular "tone" in the winding of an adjacent transformer if the cores lie in a parallel relation. On this account every other coil is "staggered," or mounted with the cores of adjacent coils at right angles to each other.

(*To be continued*)

Interstate Commerce Statistics for Class A Companies.

The bureau of statistics of the Interstate Commerce Commission has just issued its summaries of the monthly reports of the earnings and expenses of 61 Class A companies for January and February of this year, as reproduced in the accompanying tables.

The operating revenues for January, $27,383,865, showed a decrease of 7.2 per cent over the same month in 1917, while the operating revenues for February, $26,765,379, showed a larger decrease of 7.7 per cent. In January the expenses increased 16.8 over the preceding year and in February they increased 15.5 per cent.

The operating income for January totaled $5,734,074, a decrease of 19.7 per cent, and the operating income for February, $5,944,804, a decrease of 12.8 per cent.

The number of stations in service at the end of the month of February was 7,737,013, an increase of 435,458 stations, or 6 per cent.

Item.	For the month of January 1918.	1917.	Increase Amount.	Ratio per cent.
Number of company stations in service at end of month	7,704,469	7,247,523	456,946	6.3
Revenues:				
Subscribers' station revenues	$17,604,965	$16,612,092	$ 992,873	6.0
Public pay station revenues	1,600,993	1,464,194	136,799	9.3
Miscellaneous exchange service revenues.	297,538	262,088	35,450	13.5
Message tolls	6,918,433	6,339,006	579,427	9.1
Miscellaneous toll line revenues	662,268	598,084	64,184	10.7
Sundry miscellaneous revenues	296,999	259,113	37,886	14.6
Licensee revenue—Cr.	1,025,106	956,624	68,482	7.2
Licensee revenue—Dr.	1,022,437	954,157	68,280	7.2
Telephone operating revenues	$27,383,865	$25,537,044	$1,846,821	7.2
Expenses:				
Depreciation of plant and equipment	$ 4,528,896	$ 4,554,021	*$ 25,125	*0.6
All other maintenance	3,849,507	3,317,178	532,329	16.0
Traffic expenses	7,110,072	5,315,623	1,794,449	33.8
Commercial expenses	2,738,051	2,467,887	270,164	10.9
General and miscellaneous expenses	1,317,679	1,073,227	244,452	22.8
Telephone operating expenses	$19,544,205	$16,727,936	$2,816,269	16.8
Net telephone operating revenues	7,839,660	8,809,108	*969,448	*11.0
Other operating revenues	1,685	1,229	456	37.4
Other operating expenses	2,017	1,257	760	60.5
Uncollectible operating revenues	125,236	125,242	*6	....
Operating income before deducting taxes	7,714,092	8,683,838	*969,746	*11.2
Taxes assignable to operations	1,980,018	1,538,870	441,148	28.7
Operating income	5,734,074	7,144,968	*1,410,894	*19.7

*Decrease.

Results of Operations of Class A Companies for January, 1918.

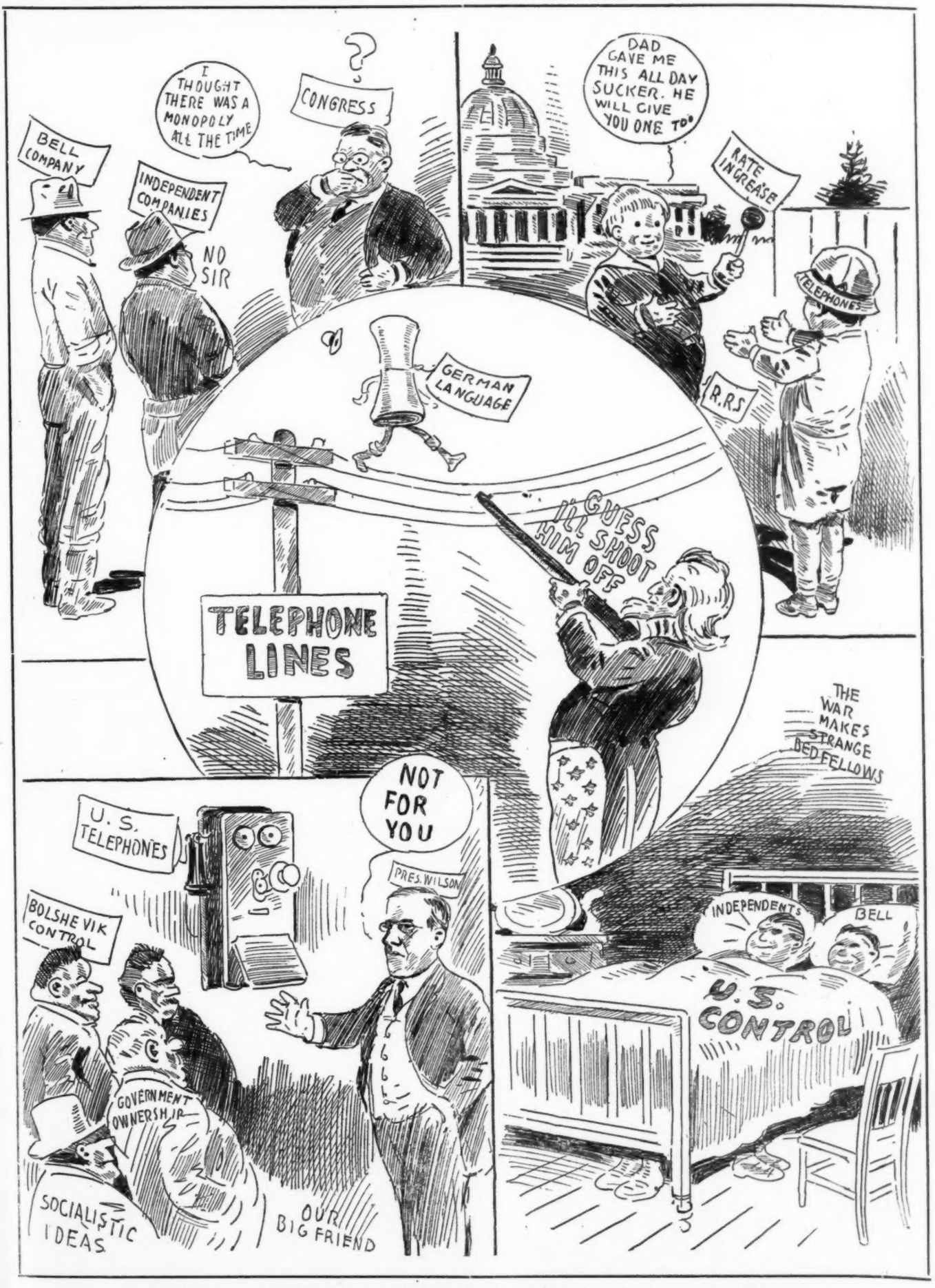
Mutual Not a Public Utility Rules Ohio Commission.

That mutual telephone companies are not public utilities and their purchase by a company which is a utility does not require the sanction of the commission was the Ohio holding, on August 8, in dismissing an application of the Farmers' Telephone Co., of Bloomville, Seneca county, to purchase the properties of the Republic Mutual Telephone Co. The commission held that the purchase of a non-utility by a utility is nothing more than the purchase of equipment in the ordinary conduct of a utility's business.

Item.	For the month of February 1918	1917.	Increase Amount	Ratio per cent.	For the 2 months ending with February. 1918	1917.	Increase Amount	Ratio per cent.
Number of company stations in service at end of month	7,737,013	7,301,555	435,458	6.0	.....	.....	.....	....
Revenues:								
Subscribers' station revenues	$17,601,087	$16,672,300	$ 928,787	5.6	$35,206,053	$33,284,392	$1,921,661	5.8
Public pay station revenues	1,417,630	1,222,253	195,377	16.0	3,018,623	2,686,446	332,177	12.4
Miscellaneous exchange service revenues.	284,927	259,382	25,545	9.8	582,464	521,469	60,995	11.7
Message tolls	6,470,233	5,833,623	636,610	10.9	13,388,666	12,172,629	1,216,037	10.0
Miscellaneous toll line revenues	703,104	601,901	101,203	16.0	1,365,372	1,199,985	165,397	13.8
Sundry miscellaneous revenues	285,878	260,649	25,229	9.7	582,877	519,763	263,114	12.1
Licensee revenue—Cr.	1,031,915	992,774	39,141	3.9	2,057,021	1,949,398	107,623	5.5
Licensee revenue—Dr.	1,029,395	989,062	40,333	4.1	2,051,832	1,943,218	108,614	5.6
Telephone operating revenues	$26,765,379	$24,853,820	$1,911,559	7.7	$54,149,244	$50,390,864	$3,753,380	7.5
Expenses:								
Depreciation of plant and equipment	$ 4,694,051	$ 4,576,479	$ 117,572	2.6	$ 9,222,946	$ 9,130,500	$ 92,446	1.0
All other maintenance	3,609,864	3,170,023	439,841	13.9	7,459,371	6,487,201	97,170	15.0
Traffic expenses	6,612,330	5,114,981	1,497,349	29.3	13,722,403	10,430,605	3,291,798	31.6
Commercial expenses	2,588,608	2,392,917	195,691	8.2	5,326,660	4,860,804	465,856	9.6
General and miscellaneous expenses	1,219,588	1,104,283	115,305	10.4	2,537,266	2,177,510	359,756	16.5
Telephone operating expenses	$18,724,441	$16,358,683	$2,365,758	15.5	$38,268,646	$33,086,620	$5,182,026	15.7
Net telephone operating revenues	8,040,938	8,495,137	*454,199	*5.3	15,880,598	17,304,244	*1,423,646	*8.2
Other operating revenues	1,579	1,226	353	28.8	3,264	2,455	809	33.0
Other operating expenses	2,235	1,406	829	59.0	4,252	2,662	1,590	59.7
Uncollectible operating revenues	126,310	118,915	7,395	6.2	251,547	244,157	7,390	3.0
Operating income before deducting taxes	7,913,972	8,376,042	*462,070	*5.5	15,628,063	17,059,880	*1,431,817	*8.4
Taxes assignable to operations	1,969,168	1,561,511	407,657	26.1	3,949,186	3,100,381	848,805	17.4
Operating income	5,944,804	6,814,531	*869,727	*12.8	11,678,877	13,959,499	*2,280,622	*16.3

*Decrease.

Summary of Monthly Reports of 61 Class A Companies Filed with Interstate Commerce Commission for Month of February, 1918.



Impressions and Opinions of the Cartoonist Regarding Government Control of the Telephones.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Order for Mitigation of Inductive Interference in California.

The California Railroad Commission has recently issued General Order No. 52 "In the Matter of the Construction and Operation of Power and Communication Lines for the Prevention or Mitigation of Inductive Interference." This order became effective August 1, 1918, and supercedes General Order No. 39 which was issued in 1914.

The rules contained in this order are based on the results of five years' investigation carried on in California by the Joint Committee on Inductive Interference, and on the recommendations made by this committee in its final report to the railroad commission.

The principle of co-operation between all parties involved has been strongly emphasized throughout as the means for determining the best methods for the prevention or mitigation of inductive interference.

A number of rules of a precautionary nature are given, not limited to the lines involved in parallels and apparatus connected thereto, but applying to all new installations.

The most important points covered by the rules are, in brief, as follows:

I. General Provisions: The essential points considered are the applicability of rules, principle of least cost, co-operation, and the relation of existing parallels to these rules.

II: Location of Lines: Distance between lines, notice of intention and avoidance and length of parallels are considered under this head.

III. Design and Construction of Lines: Rules relating to transpositions and to the arrangement and spacing of power conductors are given.

IV. Design, Construction and Arrangement of Apparatus: Rulès under this head consider the design, construction and arrangement of transformers, switches, lightning arresters, rectifiers, fuses, special instruments and communication apparatus.

V. Operation and Maintenance: Under this head balance of lines and operation of transformers and methods of switching and charging lightning arresters are the main points considered. Abnormal conditions of the power circuit are also considered.

A number of definitions are given preceding the rules defining certain technical terms employed.

The railroad commission has deemed it inadvisable to make the order retroactive and on this basis its application is limited generally to new construction, except those rules dealing with maintenance and operation of lines. The principle embodied is that all newly-reconstructed plant, as it is installed or rebuilt, shall be made to conform to the order.

Portland Merger Plans Sent to Postmaster-General.

Data covering complete details of the proposed merger of the Pacific Telephone & Telegraph Co. and Home Telephone & Telegraph Co., of Portland, Ore., have been dispatched to Postmaster-General Burleson by Claude McCulloch, acting for Oswald West, receiver of the Home company. The Postmaster-General's request for full information regarding the plans of consolidation followed recent telegraphic communication between himself and Mr. McCulloch.

As a step in the proposed consolidation, the Bell company recently petitioned the federal court to modify an order made March 26, 1914, restraining the company from further absorption of competing companies. If the Postmaster-General gives his definite approval and authorizes the consolidation, there will be nothing in the way to prevent the federal court in modifying its order, in the opinion of Mr. McCulloch.

R. S. Howard, chairman of the Portland committee of bondholders of the Home company, says the plans of the proposed merger meet with the approval of the bondholders and that they are ready to co-operate in completing the consolidation, if authority is granted by the Postmaster-General.

Contingent upon the ability to obtain materials and labor, the physical merger of the two systems can be accomplished within a year, it is believed.

Chicago Telephone Co. Asks City to Abolish Flat Rates.

Bernard E. Sunny, president of the Chicago Telephone Co., last week presented to the Chicago committee on gas, oil and electric light a request that the committee and council take up for consideration and action before adjournment for the summer the question of telephone rates and operating practices. In his communication Mr. Sunny reiterated his proposal of last May that the flat rate system be abandoned.

Mr. Sunny submits figures which show that the number of operators has decreased from 7,115 in July, 1917, to 6,707 at present employed, and says the company needs from 500 to 600 operators now. In the last seven months, the report shows, 2,437 operators have left the service. In view of this, together with the increase in traffic, a serious situation is developing, and the council is urged to act in regard to abolishing flat rates.

"No progress seems to have been made in the matter," says Mr. Sunny in his statement, "and it has been evident for some weeks that it is the purpose to have consideration and decision go over until after a summer vacation. Also, it seems to be the purpose of the council to adjourn until after the November election.

"Flat rate telephones in the Chicago exchange create approximately 221,000,000 calls per annum, and we estimate that about 81,000,000, or 35 per cent, of these calls would not be made at all if they had to be paid for on the message basis. The elimination of these valueless calls is equivalent to the service of 400 operators, and would go a long way in restoring the service to normal conditions.

"This proposed change is not only in line with the conservation policy of the federal government, but it is urgently required in the interest of the maintenance of a reasonably satisfactory service in this city."

Grand Meadow, Minn., Home Company Increases Rates.

The Home Telephone Co., operating in Grand Meadow, Minn., and vicinity, has been authorized by the Minnesota Railroad & Warehouse Commission to increase its individual line business rate from $1.35 to $1.60 per month and its individual line residence rate from $1.10 to $1.35 per month. The other rates which are not changed are $1.35 for two-party business service and $1.10 for two-party residence and multi-party rural service.

A discount of 10 cents per month is allowed on the business and residence rates if payment is made by the last day of the month following that in which service is rendered and also on the rural rates if payment for the quarter is made by the last day of the quarter in which service is rendered.

The Home company was organized in 1905 and has $9,125 capital stock outstanding, with an indebtedness of $1,700. It operates a local exchange in the village of Grand Meadow and rural lines radiating therefrom, furnishing service to a

total of 427 subscribers. Considerable reconstruction work has been done during the past 18 months, much of the aerial wire within the village being replaced with underground cable.

The company has paid a dividend averaging 5.46 per cent per annum, but no allowance has been made for depreciation. The operation of the telephone plant has been very economically carried on and inspection of the plant would indicate that dividends have been paid at the expense of plant maintenance.

The commission has had its accountant make a thorough examination of the books and records of account of the petitioner, and finds that the rates applied for are fair and reasonable and will not produce more revenue than is necessary to provide for the operating expenses, depreciation and a fair return on the investment.

Local and Rural Rates at Granite Falls, Minn., Increased.

The Granite Falls Telephone Co. has been authorized by the Minnesota Railroad & Warehouse Commission to increase its local and rural telephone rates at Granite Falls. The new rates, which are subject to a discount of 25 cents per month if payment is made by the 10th of the current month and which become effective October 1, are as follows:

Individual line business, $2.75 per month.
Individual line residence, $1.75 per month.
Two-party line residence, $1.50 per month.
Four-party line residence, $1.25 per month.
Rural multi-party (company owned) $1.75 per month.

The present rates are $2 for individual business telephones, $1 for individual residence and $1.50 for multi-party rural telephones (company owned). It has been the custom of the company to give service at $1.25 per month to stockholders owning $50 worth of stock and at $1 per month to stockholders holding $100 worth of stock or more. This is discriminatory and the company is ordered to cease the practice.

About two years ago it was decided by the company's stockholders to reconstruct the plant and install a common battery system. A petition was circulated among the subscribers which provided for an increased schedule of rates to be charged if a common battery system was installed. This was signed by 166 telephone users representing 218 telephones. The new equipment was immediately contracted for and installed. The new service has been furnished since February, 1918.

At the hearing the petitioner presented exhibits covering the cost of operation of the new plant, together with an exhibit of valuation based on an inventory made a few months prior to the hearing.

Upon consideration of the facts in this case, the commission finds that the rates petitioned for are fair and reasonable and will not yield more than sufficient revenue to provide for the necessary operating expenses, depreciation and a fair return upon the investment.

Metallic Essential to First Class Rural Construction.

In fixing certain rates for the Swift County Telephone Co., of Benson, Minn., the Minnesota Railroad & Warehouse Commission, on August 2, allowed a net rate of $1.25 per month for rural service, although the petition called for $1.50 per month net. The order does not state whether or not this rate is compensatory, but clearly outlines the commission's views as to grounded lines, in the following paragraph:

"Although the evidence submitted would indicate a good class of construction, rural service is furnished over grounded lines which, it is believed, should be made metallic before a first class rural telephone service can be furnished."

This would seem to indicate that although the service furnished over such lines may in the minds of the commissioners not be first class, it is willing to grant some increase in rates when shown that the construction is good, regardless of other conditions.

No Compensation for Crossing Railroad on Public Road.

When a telephone company, in stringing its wires across a steam railroad, complies with the law of the state with respect to the specifications of such construction and confines its poles and wires to the public road, it need not pay the railroad company for the privilege and cannot be required to enter into a contract with the latter covering such construction. Thus rules the Nebraska State Railway Commission.

The matter has come before the commission a number of times in the last few months. The Burlington railroad has never sought to enforce any charge for the so-called privilege, and the Northwestern has receded from the position after the attorneys had argued the matter out. The Union Pacific has been insisting that a $5 charge for the privilege of crossing its lines is only enough to pay for the costly records of construction of this sort that it must keep, and the commission has replied that the rights of the telephone company to use the public highway are equal to those of the railroad company, that it has no privilege of crossing to sell and that it cannot force others to pay the cost of keeping records that are valuable only to it and for which it ought to pay.

The Rock Island shows signs of fighting the proposition to the higher courts. It is submitting to all companies copies of a contract in which is prescribed the method by which the poles should be guyed and the wires fastened so that there is no possibility of their sagging and causing trouble or accident, and which provides for the $5 payment. The telephone companies have been instructed to refuse to sign these contracts, and are told by the commission that they cannot be required to build their lines in any other way than is prescribed by the state law and if they are not so built they must be reconstructed to comply therewith. If they will follow the law, the railroads cannot interfere.

Where the crossings are made on the right of way of the railroads the commission holds that the railroads have a right to demand a contract and exact a fee.

Seek to Abolish Flat Rate for Extra Exchange Service.

The Southeast Telephone Co. of Falls City, Neb., and the Stella Telephone Co. have asked the Nebraska State Railway Commission for permission to abolish a flat rate of $3 per year for extra exchange service. The Falls City company also proposes to reduce the toll charges from 15 to 20 cents to 10 cents. The commission will hold a hearing early in September.

In seeking relief from the flat rate for extra exchange service, the two companies point out that there is too much visiting over the telephone on account of this low rate and overburdened toll lines result. Paying subscribers are forced to wait while the operators are engaged in furnishing free service. Manager E. H. Towle of the Southeast company says that the low rate has become a burden which is now too heavy to handle because of the abuse to which it is now subjected.

New Company Asks Authority to Establish Rates.

The Farmers' Telephone company of Dix, Neb., asks the Nebraska State Railway Commission for permission to establish telephone rates and to issue and sell $10,000 worth of stock. The company was recently organized.

Nebraska Commission Requested to Dissolve Temporaty Order.

The Hamilton County Farmers' Telephone Association asks the Nebraska State Railway Commission to dissolve its temporary order made July 9. A rivalry between the company and the Lincoln Telephone & Telegraph Co. over securing business at Hampton and vicinity led to a situation which promised that the two organizations would duplicate lines and attempt to induce patrons of one line to transfer their business to the other.

The Farmers Association alleges in a motion to dissolve the order, that it is an attempt to create a monopoly and is

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contrary to the provisions of the anti-trust laws. It further claims that it is deprived of the right to continue business, but the order does not stop its powerful rival from its purpose to destroy the smaller organization. The commission in its order emphatically stated that the two companies must not cut into each other's territory.

Commission Orders Sale of Lot Used for Storage Purposes.

The Nebraska State Railway Commission has had a problem put up to it by the Ohio Telephone Co. that will probably compel that august body to use the back track. The company recently applied for and secured an increase in rates. In inventorying the property the commission found that part of its capital stock was invested in some real estate adjoining the exchange property. As it was admittedly not occupied by the building, the commission, without further inquiry, directed its sale and declined to allow the company any returns on this part of its investment because not used for giving service.

Now comes the company and says that it would like the commission to tell it what to do. The company strives to keep supplies on hand, poles, cross arms and various other bulky material. It must pay a high rent to the railroad if it allows these to lie on its right of way, and it now desires to know of the commission if it is not a proper investment of funds upon which returns for giving service are asked to put some money in vacant lots to use as an outdoors storage place.

Rate for Business Service Increased at Freeman, S. D.

The Freeman Telephone Exchange was given permission by the South Dakota Railroad Commission to increase its rate to business subscribers at Freeman, S. D., from $1.50 to $2 per month. The rate for residence service is $1 per month.

It appeared from the testimony in the case that the company's operating and maintenance costs have materially increased and that the revenues are not sufficient to take care of the increased cost and provide a reasonable rate of return upon the investment. The commission was of the opinion that a rate of $2 per month is not out of line with the rate in effect for like service at other exchanges in that state of approximately the same size.

Castlewood (S. D.) Allowed Uniform Rural Rate.

The Castlewood Telephone Co., of Castlewood, S. D., was recently authorized by the South Dakota Railroad Commission to publish and collect a uniform rate of $1.50 per month for rural party line service, subject to a discount of 25 cents per month when the rental is paid quarterly in advance during the first month of the current quarter.

The Castlewood Telephone Co., a short time ago, purchased the plant of the Hamlin & Deuel County Rural Telephone Co. which consisted of rural lines serving 85 subscribers. This company had in effect a rate of $1.50 per month, while the Castlewood company was giving service at a rate of $1.25 per month. Upon acquiring the additional lines, the Castlewood company was maintaining two different rates for the same class of service, which is in violation of law.

Upon complaint by its subscribers, the company has made arrangements to give continuous service on Sundays but it maintained at the hearing in this case that it was entitled to additional revenue to meet the increased cost of operation. The commission found that the rate applied for is fair and just and ordered it put into effect.

Northwestern Bell to Increase Rates at Vermillion, S. D.

The Northwestern Telephone Exchange Co. was authorized by the South Dakota Railroad Commission, on August 20, to put into effect at Vermillion, S. D., the following schedule of gross rates which are subject to a discount of 25 cents per month for payment by the 15th of the current month:

Business, main line, per month	$2.75
Business, party line, per month	2.25
Residence, main line, per month	1.75
Residence, two-party line, per month	1.50

Rate Increase Granted by Waco, Texas, City Council.

The city commission of Waco, Texas, recently granted an increase in rates to the Texas Telephone Co. The new schedule is effective as of August and provides for a rate of $6.75 per month for business telephones and business trunk lines; $12.50 for public pay stations; $2.75 for individual residence telephones and $2.25 for four-party residence telephones.

It is estimated that these rates will yield a return of 6 per cent upon the investment, after allowing for depreciation. The rates asked for by the company provided for a return of 8 per cent.

Complains About Toll Rate.

County Judge C. R. Luker, of Laurel county, Ky., recently filed a complaint with the Kentucky Railroad Commission, alleging that the telephone company charges $2 a month and collects 20 cents for each call to London and Pittsburg and 30 cents to points outside the county. He asks for a more reasonable toll rate.

Summary of State Commission Hearings and Rulings.

ILLINOIS.

August 14: Petition filed by the Litchfield Telephone Co. for authority to increase its rates in Litchfield, Montgomery county.

August 14: Petition filed by the Mount Auburn Telephone Co. for authority to increase its rates in Mount Auburn, Christian county.

INDIANA.

August 14: The Peoples Co-operative Telephone Co. of Stockwell, filed a petition for authority to increase rates.

August 23: The Union Home Telephone Co. of Lawrence county, filed a petition for permission to increase rates at Bedford and other towns in Lawrence county.

August 28: Hearing in Indianapolis on petition of Northern Indiana & South Michigan Telephone, Telegraph & Cable Co., of La Grange, vs. the Peoples Mutual Telephone Co. et al. The case is one that has been pending before the commission for some time.

August 29: Hearing at Glenwood on the petition of the Rush County Telephone Co., for authority to establish an exchange at Glenwood.

MINNESOTA.

August 23: The commission granted an increase in local and rural rates to the Home Telephone Co. at Grand Meadow.

August 24: The commission granted an increase in rates to the Granite Falls Telephone Co. at Granite Falls and vicinity.

August 26: Hearings at Redwood Falls on the application of the Redwood Falls Electric Telephone Co. for an increase in rates for business and residence service within that village.

August 29: Hearing at Lewiston on the application of the Mount Vernon Telephone Co. to increase its local and rural rates at Lewiston and Altura.

September 3: Hearing at St. Paul on the valuation and appraisal of the property of the Watertown Telephone Co., in the application of the company for an increase in rates at its Delano exchange continued from July 16.

September 16: In re application of the Pine Island Telephone Co. for authority to increase its exchange rates at Pine Island, the company was ordered to show cause at the commission's office in St. Paul, why the inventory and valuation of the engineer of the commission should not be accepted as the true value of the company's properties.

NEW YORK.

August 26: Hearing in the village of Fredonia in the matter of the complaint of Village President Drake, of Fredonia, in regard to the service and increase rates of the Dunkirk & Fredonia Telephone Co.

PENNSYLVANIA.

August 12: Complaint filed by the Bedford-Fulton Telephone Co. that the Chapman's Run Mutual Telephone Co. is about to parallel its lines.

August 14: Hearing on the application of the Central District Telephone Co. for permission to sell its property and franchise to the Bell Telephone Co. of Pennsylvania.

SOUTH DAKOTA.

August 20: Freeman Telephone Exchange authorized to increase business rate at Freeman from $1.50 to $2 per month. No. 3072.

August 20: Castlewood Telephone Co., of Castlewood, authorized to establish a uniform rate of $1.50 per month to all rural subscribers. No. 3137.

August 20: Northwestern Telephone Exchange Co. authorized to increase its rental rate at its exchange in Vermillion.

Driving Pole Stubs with Motor Truck

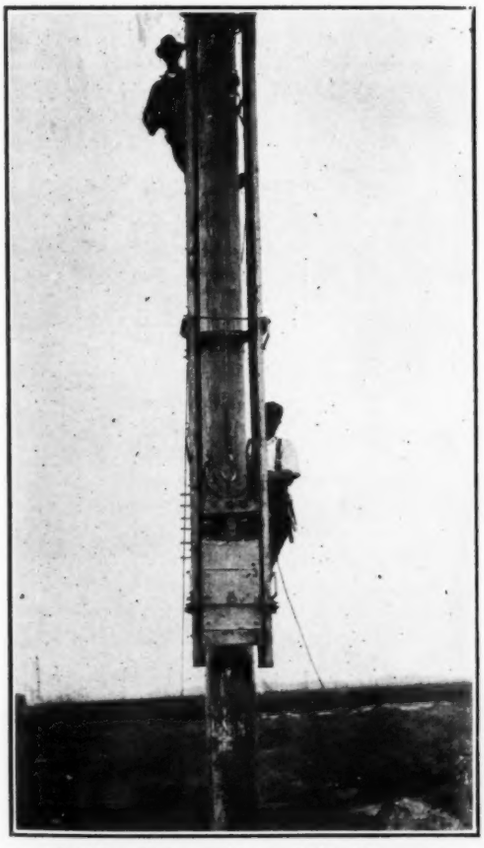
How Reinforcing Piles Were Driven to a Depth of 14 Feet Alongside Poles of Toll Lead in Southern California Which Passed Through a Section of Silty Ground—Published Through Courtesy of The Pacific Telephone Magazine

The portable equipment for driving piles with a motor 'truck shown in the accompanying illustrations was designed and used successfully by the southern division construction department of the Pacific Telephone & Telegraph Co. for reinforcing with stubs poles set in silty ground.

The development of this equipment was occasioned by the need for preventing damage from flood waters to a section of an important toll lead between Los Angeles and Long Beach, Cal. This section of the lead was situated in silty ground in the bed of a wide drainage channel locally known as a "wash." Although the route for the lead was the safest one that could be selected at the time the lead was constructed, unusual volumes of flood waters in recent winters had changed the channels in the wash and carried away soil from around the poles to such an extent as to jeopardize the safety of the lead. A portion of the section consisted of poles hurriedly and somewhat insecurely set to replace poles that had been entirely washed out.

Arrangement of Motor Truck and Equipment.

The initial surveys made to determine what should be done to insure continuity of service over the lead indicated the desirability of constructing a new lead in a safer location to replace the section exposed to the action of flood waters, it being impracticable on account of the character of the soil to reset the poles in the same location, or reinforce the poles in the ordinary manner. Plans to do this had been made, but the construction department in an effort not only to provide adequate stability at the least possible cost, but also to conserve material, developed and successfully carried out the plan for reinforcing the existing lead with pile stubs.



Details of the Guide and the Hammer.

The special equipment utilized is essentially a portable pile driver having the guides for the hammer designed for attachment to the poles alongside of which the piles are to be driven. As shown in one of the illustrations, the device with the two prongs on the top of the hammer automatically releases the hammer when it reaches the top of the guides and automatically reattaches the line when payed out to pull up the hammer for another blow.

The hammer is made of concrete and weighs approximately 650 pounds. It was raised in the guides by means of a steel rope running through the snatch blocks to the hauling winch on the motor truck which remained on the road paralleling the pole line, about 75 feet away. There was a stream of water about 40 feet wide between the truck and the pole. A wire rope ran from the hauling winch in the bed of the truck just behind the seat through snatch blocks on the rear end of the truck, on the pole at the ground line, and near the top of the pole, to the hammer in the guides.

Another illustration shows how the driver rigging was moved from one pole to another and how the hauling line for raising the hammer was used for that purpose. The same illustration shows a stub driven into place.

Piles 18 feet in length were driven to a depth of 14 feet alongside the poles and the poles were secured to these pile stubs in the usual manner. The piles were driven in an average time of 30 minutes. The labor cost per pile driven was $6. The hammer and guides were constructed in the company's shops at a cost of approximately $35. By the use of this equipment the poles were very securely reinforced for a little over 10 per cent of the estimated cost of relocating the lead as first proposed, resulting in a saving of approximately $7,500, a most worth while sum.

Stub in Place—Hauling Rigging to Next Pole.

It will be apparent that with this equipment piles can be driven for stubbing poles set in marshy or silty soil wherever there is a road or firm ground in the vicinity of the poles.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1045. What are "ineffective" calls? Give the cause of one kind of "ineffective" call. What is the flashing recall? Explain the difference between the mechanically-operated flashing recall and that produced manually by the subscriber. Trace the circuit conditions producing the flashing recall in the cord circuit arrangement shown in Fig. 279.

1046. How can the interrupted current required for the flashing recall be produced? Do you think that the irregular flash produced manually is as effective in recalling the answering operator as the regularly flashed lamp produced by mechanically interrupting the current?

1047. What happens when the operator using the cord circuit arrangement shown in Fig. 279, removes the answering plug by mistake prematurely? Why is it necessary that she be advised of the occurrence of this mistake at once? Why must the ringing of the called telephone proceed without interruption while the improperly-removed answering plug is being reinserted? Trace the circuit conditions apprising the answering operator using the cord circuit arrangement shown in Fig. 279 that the answering plug has been prematurely removed.

1048. How is the disconnect signal given to the operator using the cord circuit arrangement shown in Fig. 279?

CHAPTER XXXI. Call Distribution.

1049. *Development of "teamwork" among operators.*—The early development of telephone switchboard equipment indicated to engineers that existing arrangements did not afford the most economical operating conditions. The full line multiple within reach of every operator provided a means for connecting directly with all the lines served by the switchboard from each calling group.

The necessary division of the answering jacks into groups, each group served by a fixed proportion of the operators' positions, however, emphasized the occurrence of the group traffic load peaks. It often happened that the operator working at one switchboard position was practically or entirely idle while her neighbor was struggling with the heavy rush of business due to the occurrence of a traffic load peak in the line group terminated there. In order to obviate this condition, telephone engineers worked out an elaborate theory of operating by means of "teamwork."

Each operator was instructed to watch neighboring positions and to assist, by using her own cord pairs, in handling the traffic presented to the operators at neighboring positions whenever that on her own position permitted. With an operating force keenly alive to the necessity of furnishing good service, and all anxious to contribute to this general result, the practice of "teamwork" accomplished the result sought.

Operators soon learned to spot the numbers of the answering jacks on the neighboring positions so that they could answer their neighbor's calls by plugging into the multiple, should that happen to be more convenient than reaching to the answering jack. The efficiency of the entire system, however, depended upon the operating-room discipline. Should discipline be relaxed, for any reason, the indifferent operator could more or less neglect opportunities to assist her neighbor with a corresponding depreciation in the grade of service given by the office as a whole.

1050. *The idle operator.*—In the discussion of telephone traffic, a term is often used which is almost self-explanatory. This term is "the idle operator." It means the operator who, at any given moment, may not be busily engaged in passing through calls from the group of lines before her and who is, therefore, available, provided the traffic of the moment at another group can be diverted to her.

Obviously, the term may be used to designate any operator who is less busy than another one at any given moment. If one manual operator is handling calls at the *rate* of 250 per hour and her neighbor is handling calls at the *rate* of 50 per hour, the second operator, within the meaning of the term as it is used, is "the idle operator."

It is obvious that any practicable and reliable scheme permitting the "idle operator" to have access to calls normally or usually handled by some other operator, who is busy at the moment, will have the effect of standardizing the serv-

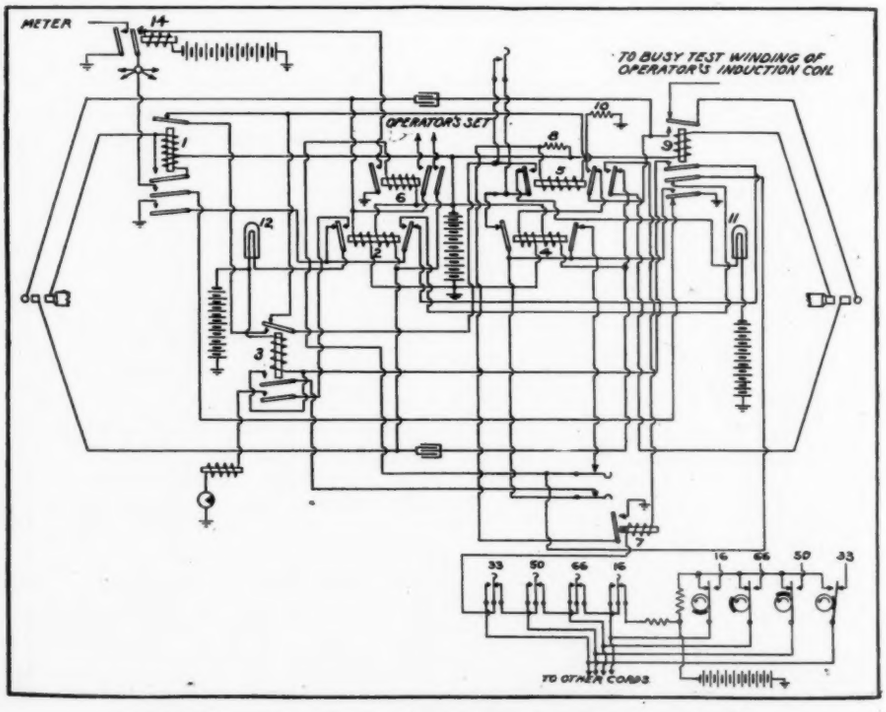


Fig. 279. Cord Circuit with Complete Automatic Features.

ice and of eliminating, to a degree, the effect of local traffic load peaks in groups. This is the object of all call-distributing systems now offered.

1051. *The ancillary line lamp.*—One of the earliest efforts to accomplish, in part, the distribution of calls to idle operators was the use of ancillary line lamps. By this method, the calling line lamp is simultaneously displayed at several operators' positions instead of at one only. The theory underlying the use of ancillary line lamps is as follows:

An incoming telephone call is simultaneously received on all the operators' positions where one of the several lamps associated with the calling line is displayed. All the line lamps associated with the one line are energized by the current flow permitted to pass when the line relay of the calling telephone line is operated.

Should there be four line lamps on each circuit, for instance, the call would be signalled to four points on the switchboard. At some one of these four positions an operator would be able to give the call earlier attention than at all the others. Accordingly, this operator answers the call and when the answering plug is inserted into any one of the line jacks, all the line signals at other positions are, of course, instantly extinguished.

In other words, the line circuit equipment includes the usual line relay, but the contact of the line relay controls the circuit of three additional line lamps placed at different operators' positions. Therefore, when the operated line relay is released by the insertion of the answering plug, the resulting restoration of its normally-open contact to normal, will interrupt the flow of current through all the associated line lamps which are in parallel.

1052. *Advantages and disadvantages.*—The use of ancillary answering jacks effects improvements in service in most cases. It has been found, however, that the number of line lamps associated with each line cannot profitably be indefinitely expanded. This is true for several reasons, one of which is the excessive operating current required as the number of lamps is increased.

It will be remembered that the item of current consumption which makes the heaviest demand upon the battery of the common battery lamp signal office, is the current required to display the various lamp signals. Each call, therefore, in offices equipped with ancillary line lamps, requires more electric *power* than a similar call in the telephone office having line circuits equipped with only one lamp signal. The additional power required is not, however, so serious in amount as to neutralize the improvement in service when such an improvement in service is demanded by the public as a condition of its patronage.

1053. *Operating conditions.*—In order that the ancillary line lamp plan should accomplish the maximum of economy and of service improvement, it is obviously necessary that one operator only, and that one the idle one, attempt to answer each call. Should two operators, at different positions, for instance, attempt to answer the same call, the result would be not only a waste of effort, but confusion in the necessary contact with the calling subscriber.

A condition of this sort is remedied, in part, by the device used in the primary energization of sleeve relay 1, Fig. 279. While this device prevents two operators from successfully connecting with the calling line circuit, at the same time it cannot prevent the *wasted effort* and wasted *working time* due to the needless insertion of the answering plug on the part of one of the two.

In order to prevent this needless work on occasional calls, the expedient has been tried of distinctively coloring the different line lamps associated with each line for the several positions on which they are installed. For instance, the line lamps to which a given operator was to give preference were equipped with lamp caps colored yellow. At other operators' positions, the line lamps associated with this *same line* might be red on one position, green on another and blue on the fourth.

Another line circuit would be provided with a yellow lamp on the fourth position indicating that the operator at that position was to give *that* line along with others displaying yellow signals, preference. When this same line signal appeared at the first position, it might be equipped with a blue line lamp indicating that the operator at the first position was to disregard it until all the yellow, green and red signals before her had been answered and cleared out.

In this way, yellow lamp signals were distributed to all the operators' positions and they corresponded to the usual line signal lamps in switchboard equipment not equipped with the ancillary signals. Each operator is instructed to answer all yellow signals appearing before her and then, to answer the red signals, next the green and lastly the blue. If she happened to be idle, she was to answer any color of signal on her position at once.

Having trained the operators to work in this way, it is somewhat difficult to arrange for working with a reduced operating force at the switchboard during periods of light traffic. Unless *all* the positions were occupied, the operators would, obviously, have to disregard their instructions and give instant attention to some signal other than the yellow one. This is because the yellow signals were equitably distributed through the various positions occupied during the period of *heavy* load.

When a *less* number of positions is occupied, it is obvious that the yellow signals on the *unoccupied positions* could not receive instant attention. As a result of this, the signals are now usually made of the same color and chance is relied upon to prevent a conflict between answering operators. A tendency in modern practice to refrain from multipling the line lamp signals more than four times regardless of the size of the office, is also becoming clearly apparent.

With these several qualifications, the use of ancillary answering lamps offers a simple method of securing an increase in the amount of *operators' attention* possible to assign to the average call. Such an increase, while somewhat less than might have been anticipated, *does* effect an improvement in service.

(*To be continued.*)

Keystone Statement of Earnings for Month of July.

The Keystone Telephone Co., of Philadelphia, Pa., has issued its comparative statement of earnings for the combined companies for the month of July, 1918, and the seven months ended July 31, 1918, as follows:

	For month ended— July 31, 1918.	Year previous.
Gross earnings	$129,652	$130,548
Operating expenses and taxes	82,204	67,653
Net earnings	47,448	$ 62,895
Less interest charges	29,177	28,065
Dividends		
Surplus and reserve	18,271	34,830
	For 7 months ended July 31, 1918.	Year previous.
Gross earnings	$936,961	$908,375
Operating expenses and taxes	545,767	470,608
Net earnings	391,194	437,767
Less interest charges	200,744	194,815
Dividends	106,527	106,527
Surplus and reserve	83,923	136,425

New Telephone Line Under Construction in Panama.

A new telephone line is being constructed to connect Colon, Panama, with the small town of Porto Bello, situated about 20 miles east of the city at one of the best harbors on the Carribbean coast of Central America.

Before the completion of the Panama railroad, in 1855, Porto Bello was the Atlantic port for the overland traffic across the Isthmus of Panama.

Information on War Activities in Classified Directory.

"Chicago War Activities" is the title of a new department added to the July edition of the classified directory of the Chicago Telephone Co. Three pages of the book are devoted to the names and telephone numbers of the various branches of war work and war relief work. With the name, address, and telephone number, a brief explanation is given of the character of the work done by the individual branches.

Sundry Snapshots Along the Trail

Observations and Comments, Pertinent and Otherwise, On the Sunshine and Shadows of Telephone Work

By Well Clay

The Devil bought him an automobile
And started out for a spin;
It had a gilded steering wheel
But the horn was made of tin.

This car of his was roomy and wide;
'Twas certainly built for speed
Passengers flocked from every side—
It's only brake was greed.

His first move was to gather a load,
And little time did he lose,
Then started his trip on a downhill road,
With the tanks well filled with booze.

He gathered them in from brothel and still;
The crowd it grew and grew
The car was older than the oldest hill,
But it looked to them like new.

Merrily they rolled through the streets of sin
And the parkways of license and lust;
Estranging good friends which might have been,
Grinding dear ones into the dust.

Many a youth, all flushed with wine,
Clasped the hand of some maiden fair,
As they bowled along the boulevards fine
Without a thought or care.

Soon many a bump these riders got,
For the way grew rough and wild,
But the speed was abated never a jot;
And the Devil smiled and smiled.

A lurid light loomed up ahead
Just as the darkness fell,
And a man who was on the back seat said:
"Gee Whiz, but ain't this H——l."

Which was identical with the remark made recently in my hearing by a Socialist of long standing. He was newly-informed of the fact that the government had taken over the telephones and that he would probably have to go to a cash basis in the payment of his telephone bills hereafter, instead of once-a-year as has been his custom in the past, while busy preaching the doctrines of public ownership of all utilities.

He believed the idea was all right but what he had not figured on any of the time, was the possibility of some other party besides the socialists doing the taking over. Like the drinkers, he was willing to do the thing himself but thought other people had better not monkey with the proposition at all. When the government had passed his wildest dreams in the way of taking over railroads and other things, he was disgusted. He wanted to have a hand in the matter personally. Then too, the aspect of financial arrangements being interfered with was to his mind an outrage.

To him the telephone company was hard to visualize as a part of the government. It was just Bill Jones and Tom Brown, and the rest, the same as it always had been. The mail box on the corner represented to his mind the government, but the telephone pole in his field was just the same old pole without any paternal safeguards from wilful molestation or damage.

Just as typhoid fever is avoided in people by the injection of typhoid serum in increasing doses until they become immune, so it was with my friend who is swiftly changing his views on political matters because he has had too big a dose at once, and the result has made him lukewarm on a proposition on which he was so keen before. As professional administers of the dose, however, telephone men as a rule, I believe, are of the opinion that the effects will be beneficial. Nearly all telephone managers seem to have taken proper advantage of the fact that the government is now in control and have been cleaning up their past due accounts, ready for the checking in by Uncle Sam's corps of expert accountants when the time arrives.

There seems to be only one objectionable feature in the matter, to most of the stockholders in telephone companies, to the way matters are shaping themselves —that is the uncertainty of the tenure of the government. If they had been taken over for good and all, it would have been better under the circumstances.

I have always noticed that automobile salesmen never attempt to teach a purchaser of a car to run it until after he has paid for it or, at least, the sale is completed and the title in the patron; then if anything happens, the loss will fall on the buyer and not on the original owner. This might also be said about the ownership and operation of telephones by the government, from the standpoint of the stockholder. The prospect of being handed back a damaged or obsolete machine is never alluring.

One thing, however, seems to be universally expressed by all the people in the Independent field. It is the idea that the men in the Independent field who are actually operating the plants, are going to give the government the very best support possible in carrying out the new plans. That fact alone will go far towards making a success of the venture, if too much experimenting is not indulged in by novices in the business who may be newly-appointed as administratives.

One thing we know is that regardless of what other matters may come to pass, the plants are to be kept up. No manager need be backward about preparing to see that his depreciation account is to be spent on the lines and equipment. Labor may be such that he cannot do all that is necessary now, but he can have the fullest of specified information as to what is to be done when labor is available. He can arrange to have written reports on just what is to be done on occasion, filed together with material lists and prices.

In other words, we must come to the budget system and this let-up time in activities, pending the settlement of vital parts of the program, is a good time to start on these matters; then, when the time comes, we will be ready to shed information galore. The government must not be able to place any blame on the Independents in case any possible failure ensues. We must get ready, be ready and stay ready.

Whether you intend to remain in the harness as managers under the government or not—provided you have any option—you will owe it to the people you have been working for and the community in which you operate, to turn over the plant in the best shape possible, insofar as the matter lies in your hands.

Clean up all old affairs that have been dragging along for many moons, whether they be financial or in the line of repairs and maintenance. Fix up those leaning poles, replace those broken-off guy wires, rotten arms and pins. One rotten arm in a line of poles will give the casual inspector the impression that the whole line is in pretty much the same condition and it will reflect on the value allowed your plant on the government books.

Odds and ends of abandoned loops should be taken down and the poles and wires put back in stock. Broken ground wires which hang from poles in any old way, should be tacked back to the poles and all loose wires put in place. General impressions will be matters of dollars in the ascertaining of values allowed and no manager should neglect this very vital matter.

You are, in fact, selling your plants to the government and the government is going to be very critical in the matter of values. You want the government to get value received, but you wish to have the same great blessing. The government will spare no expense to ascertain whether it receives what it pays for, and you should likewise avoid carelessness in the matter.

APHORISM: It takes at least two *interested* men to make a *fair* horse trade.

What Is Your Company Doing?

Chats About Company Doings.

By Stanley R. Edwards.

All linemen are not as fortunate as a Bloomington, Ill., lineman. The poles and cross arms were wet and slippery as a result of a rain and fog. The lineman failed to use his climbers, his foot slipped off the cross arm, and he fell.

Fortunately for him, the local doctor had tied his horse to the pole and the buggy top was up. The lineman fell on top of the buggy, frightening the horse and causing him to run away. But the fall upon the buggy saved the lineman's life.

Both this accident and the one depicted on the page reproduced from the Safety First Bulletin of the Texas Telephone Co., were the result of carelessness. One accident resulted fatally—and as a result of both accidents, Safety First principles are not scoffed at by certain linemen.

Shortage of help in all departments, makes it essential that the public do its part in the furnishing of service. The war has taken many valuable employes from the companies, and there are now companies in various parts of the country which will find it impossible to keep operating, if any more employes are taken.

A storm, flood, fire or any other of the many trouble-causing conditions which continually confront telephone companies, would result in service being seriously crippled.

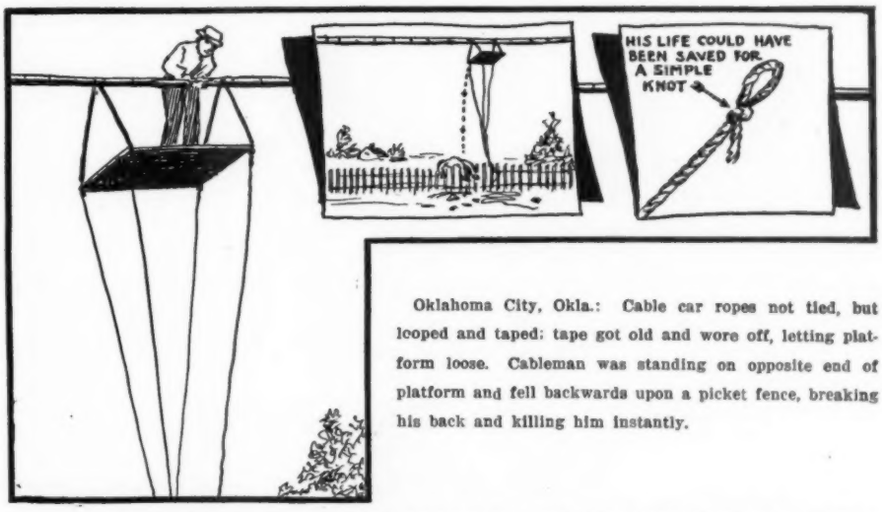
Being now under government control, it is likely that Postmaster General Burleson will act to secure exemption for such employes as are vitally essential, if the specific cases are taken up with him. The post office employes have been granted exemption as have also some of the railroad men. It is logical to assume that the men essential to the continuance of telephone service will be exempted.

Many trained telephone men have already joined the army and this combined with the shortage of operators and other help make it essential that the subscribers do all of their part whenever a telephone call is made.

The Waseca Telephone Co., Waseca, Minn., of which H. G. Myers is superintendent, has sent out a letter to all its rural subscribers directing attention to trouble caused on telephone lines during the harvesting season. The letter follows:

"Every year during harvest we have more or less trouble by lines being crossed or broken, nine-tenths of which could be avoided.

A fishpole used as a whip while cut-



Oklahoma City, Okla.: Cable car ropes not tied, but looped and taped; tape got old and wore off, letting platform loose. Cableman was standing on opposite end of platform and fell backwards upon a picket fence, breaking his back and killing him instantly.

"Safety First" Bulletin of the Texas Telephone Co. and Associated Companies Tells a Story Graphically and to the Point—Actual Occurrences Are Cited as Examples.

MODERN TELEPHONE COMPANY
INDEPENDENT
LOCAL
AND
LONG DISTANCE
TELEPHONE
INDEPENDENCE CITY, ILLINOIS

YOUR PART AND HERS

Good telephone service depends not only upon the telephone equipment and the skill and intelligence of the telephone employes, but also upon the co-operation of the telephone USERS.

It is the responsibility of the calling person to be sure to give the operator the right number, speaking slowly and distinctly.

The operator's responsibility is, in turn, to answer the caller's signal promptly and to give the desired connection quickly and accurately.

Still further, the called person co-operates towards good service BY ANSWERING PROMPTLY; and each helps by speaking distinctly and by practicing courtesy and patience under all conditions.

Modern Telephone Company
The Independent Building
Service and Progress Streets

The Modern Telephone Co. Runs an Advertisement Each Thursday in the Local Evening Paper at a Cost of $4.20. This is the Full Size of the Advertisement.

ting under the wires, causes a great many crosses each year—a fork in a load of bundles likewise is responsible for crosses—running into a pole with a binder often causes the wires to break or cross—threshing machines cross a great many lines.

This year more than ever before, it is necesary to keep the lines working at all times. We, therefore, ask you to please be careful. However, accidents will happen, no matter how careful you may be, but try to make such temporary repairs as to keep the lines working—and notify us at once.

Rural lines, as a rule, as very busy, especially so during harvest. For the sake of good service, we ask you to make your conversations as short as possible, so all may have a chance to use the lines and to give business calls the preference.

A slight effort on your part will greatly assist us in doing what we are ever endeavoring to do—give you the best possible service."

The company hopes that by thus calling attention to the telephone lines, to avoid a great deal of trouble it has had in former years.

Last week Director General of Railroads McAdoo, issued an order to all employes in the railroad service of the United States on the subject of courtesy. Here is what Mr. McAdoo has to say:

"Complaints have reached me from time to time that employes are not treating the public with as much consideration and courtesy under government control of the railroads as under private control.

I do not know how much courtesy was accorded the public under private control, and I have no basis, therefore, for accurate comparison. I hope, however, that the reports of discourtesy under government administration of the railroads are incorrect, or that they are, at least, confined to a relatively few cases. Whatever may be the merits of these complaints, they draw attention to a question which is of the utmost importance in the management of the railroads.

For many years it was popularly believed that 'the public be damned' policy was the policy of the railroads under private control. Such a policy is indefensible either under private control or government control. It would be particularly indefensible under public control when railroad employes are the direct servants of the public.

'The public be damned' policy will in no circumstances be tolerated on the railroads under government control. Every employe of the railroad should take pride in serving the public courteously and efficiently. Courtesy costs nothing and when it is dispensed, it makes friends of the public and adds to the self-respect of the employe.

My attention has also been called to the fact that employes have sometimes offered as an excuse for their own shortcomings, or as a justification for delayed trains or other difficulties, the statement that 'Uncle Sam is running the railroads now' or 'These are McAdoo's orders,' etc.

Nothing could be more reprehensible than statements of this character, and nothing could be more hurtful to the success of the railroad administration or to the welfare of railroad employes themselves. No doubt, those who have made them have done so thoughtlessly in most instances, but the harm is just as great if a thing of this sort is done thoughtlessly as if it is done deliberately.

There are many people who for partisan or selfish purposes wish government operation of the railroads to be a failure. Every employe who is discourteous to the public or makes excuses or statements of the kind I have described, is helping these partisan or selfish interests to discredit government control of railroads.

Recently the wages of railroad employes were largely increased, involving an addition to railroad operating expenses of more than $475,000,000 per annum. In order to meet this increase, the public has been called upon to pay largely increased passenger and freight rates. The people have accepted this new burden cheerfully and patriotically. The least that every employe can do in return is to serve the public courteously, faithfully and efficiently.

A great responsibility and duty rest upon the railroad employes of the United States. Upon their loyalty, efficiency and patriotism depends in large part America's success and the overthrow of the kaiser and all that he represents. Let us not fail to measure up to our duty, and to the just demand of the public that railroad service shall not only be efficient, but that it shall always be courteously administered."

The fact that the government is now in control of the telephone companies is no reason why there should be any let up in the efforts of employes to permit a service pleasing in every way to the public. We know that Postmaster General Burleson will not have occasion to issue such an order as the one quoted to telephone employes of the government.

The Fourth of July parade is the big event in all places in the United States, and Jacksonville, Ill., is no exception.

This year the Illinois Telephone Co. decorated its motor truck, gathered together all the operators that could be spared and let the people of Jacksonville know that the company and its employes are as patriotic as the next one.

The accompanying illustration gives a good idea of the company's float as it appeared in the parade.

Float of Illinois Telephone Company in Fourth of July Parade at Jacksonville, Ill.

New Brunswick-Prince Edward Island Direct Telephone.

By the laying of a direct cable between Cape Tormentine, New Brunswick, and Cape Traverse, Prince Edward Island, an undertaking just completed, direct telephone connection between New Brunswick and the island towns has been established.

Heretofore the only telephone service available was by way of Pictou, Nova Scotia, and cable thence across the Northumberland Strait. This was a roundabout route and not always satisfactory. The new line which has been put through by the New Brunswick and Prince Edward Island telephone companies acting conjointly, affords Moncton connection direct with Charlottetown, the charge being 65 cents for 3-minute conversation.

Biographical and Personal Notes

Chas. W. Forbes, well known among Independent telephone men of the West, who has been operating an exchange at Hermosillo, Mexico, writes TELEPHONY that he has decided to leave for the States, and will make his home in San Francisco, Cal., for a time. He tried to get into the war, but a lame hand prevented him from being accepted.

Jesse Weik, president of the Greencastle Telephone Co., of Greencastle, Ind., who was injured a few weeks ago when he was hit by an automobile, was recently taken to Indianapolis from his home at Greencastle for treatment at the Fletcher Sanitarium. Mr. Weik, who suffered a concussion of the brain, had not been recovering as rapidly as he should have and he was transferred to Indianapolis in the hope that the change would bring about a decided improvement in his condition.

Dr. Robert E. Gordon, secretary-treasurer of the Illinois Independent Telephone Association, and president and manager of the El Paso (Ill.) Telephone Co., is a pioneer in the telephone business in his territory and one of the organizers and staunch supporters of the Illinois association.

A practising physician for 25 years, Dr. Gordon entered the telephone field in 1899 and 1900 mainly as a matter of convenience to his patrons. The Bell company refused to give the farmers

Dr. R. E. Gordon, Secretary-Treasurer of Illinois Association.

service with Independent equipment, so Dr. Gordon proceeded to install the first telephone system in his county. It consisted of six country lines with 100 subscribers on a home-made switchboard which he himself had constructed of call bells, binding posts and knife switches, and installed in his residence.

In 1901 he organized the El Paso Telephone Co., becoming its first president. He has held that office ever since and, in addition, has been manager of the company for the past ten years. From a small beginning with 300 telephones in operation, the El Paso company has grown to a system with 1,200 subscribers. It now has one telephone to every 2½ inhabitants in the city of El Paso, a record, so far as TELEPHONY's editors have knowledge.

Dr. Gordon is a native of Illinois, his arrival having been recorded in the town of Carlyle, September 5, 1872. His education was acquired in the Carlyle high school and the Lebanon and Washington universities.

His hobby and ambition is to give first class service and to build up the membership of the state association. The association is fortunate in having as secretary a man like Dr. Gordon—one in whom is confined the constructive, logical thinker, business man and moralist, one who has a great breadth of comprehension and depth of understanding of people and things in general.

T. H. Considine, manager of the Northwestern Telephone Exchange Co., in Albert Lea, Minn., for the past five years, has been appointed manager for the Tri-State Telephone & Telegraph Co. at Owatonna, Minn., exchange. He succeeds **F. K. Skoog,** who has been transferred to St. Paul, where he will be employed by the Tri-State company in field work.

H. G. White, manager of the Bradshaw (Neb.) exchange, of the Lincoln Telephone & Telegraph Co., has entered the army. The work of that exchange will be handled from York for the time being.

G. S. Meek, of Gypsum, Kans., has been appointed local manager of the United Telephone Co. at Belleville, Kans., succeeding Harley L. Pierce.

John C. Koons, first assistant postmaster-general and a member of the government's telephone and telegraph committee, is a native of Maryland. He was educated at the Franklin High School, Reistertown, Md., and entered the railway mail service, after civil service examination, as substitute clerk at Baltimore, March 20, 1895, and advanced to the highest clerical grade.

In 1906 Mr. Koons was appointed a postoffice inspector in the Kansas City division. He became division superintendent of railway mail service at Cleveland, Ohio, April 1, 1911, and superintendent, division of salaries and allowances, postoffice department, Washington, October 3, 1911.

Mr. Koons was promoted to the posi-

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John C. Koons, First Assistant Postmaster General, in Charge of Telephone Administration and Organization

tion of chief postoffice inspector April 1, 1915, and became first assistant postmaster-general by appointment of President Wilson, September 1, 1916.

In addition to the regular duties of his various offices, he served as chairman of the departmental committee which developed the parcel post in United States, and was a member of a committee appointed by the Postmaster-General in 1913 to assist in study of government ownership of telegraphs and telephones.

As member of the government's committee on telephones and telegraphs, Mr. Koons, with Postmaster-General Burleson, has charge of administration and organization of the service.

Lieut. G. T. Wyche, formerly connected with the Cumberland Telephone & Telegraph Co., at Louisville and Owensboro, Ky., in a recent letter to friends in Louisville stated that he is recuperating from the effects of gas and shell shock received on the third day of battle of the Marne.

Obituary.

W. A. Clements, of the Monrovia Telephone & Telegraph Co., Monrovia, Cal., passed away recently at his home in Monrovia.

Warren D. Haggerty, president of the Sussex Telephone Co., died recently at his home in Sussex, N. J.

E. S. Bramel, manager of the Newburg Telephone Co., Newburg, Pa., passed away recently.

From Factory and Salesroom

Conventions: Indiana, Indianapolis, September 11-13; Illinois, Peoria, November 6-8

Sugar in Transmitters—Did You Know About It?

Paul D. Myers, Illinois sales representative for the Stromberg-Carlson Telephone Mfg. Co. says that after TELEPHONY, the next best reading for the telephone man is the Chicago Tribune. In proof of this contention, he states that on August 4 that paper attributed the present shortage of sugar to the large amount of that commodity used in telephone transmitters.

In his report on this startling condition of affairs Mr. Myers observes in a letter to the company:

"This knowledge is a complete surprise to me, and explains many things, which heretofore have been obscure. For instance, I have frequently observed that certain operators have very 'sweet' voices, but always attributed it to natural causes.

If sugar in the transmitter is the real cause of this phenomenon, I would suggest that you use a more 'refined' quality of sugar in the regular subscribers' sets, and the addition of a little 'honey' in all operators' transmitters. This would greatly improve the saccharine tones of all telephone users, and our reputation would no doubt extend from 'pole to pole.'"

Large Foreign Shipment of Stromberg-Carlson Company.

Since the war began, foreign buyers of telephone equipment have been placing many orders with American telephone factories. The accompanying illustration is visual evidence that Stromberg-Carlson apparatus is in demand. This illustration shows 20 new local battery switchboards packed for ocean shipment. This is a single order destined for a 10,000-mile journey overseas.

Naturally the transportation to such a distant point involves many more difficulties than a shipment to a buyer in the United States. The packing cases must be heavier and stronger, and precautions must be taken to protect the equipment by making the package moisture-proof to avoid the corrosive effects of sea air.

Recently the Stromberg-Carlson Telephone Mfg. Co. received a letter from a buyer in South Africa in which he stated that, due to thoroughness with which S-C products were packed, the goods arrived after their long journey absolutely unharmed and in better condition than shipments received from points only several several hundred miles distant.

Stromberg-Carlson Switchboard Ready for Foreign Shipment.

Distribution of Unskilled Labor Will Win the War.

The right men in the right jobs will win the war. This is the purpose for which the United States government took over the employment of labor the first of this month—to facilitate the proper distribution of labor in industries necessary to the winning of the war.

The Diamond Expansion Bolt Co., of New York City, is patriotically devoting its advertising space to giving publicity to the United States Employment Service. This is the official bureau of the federal government in charge of the distribution of labor for war work. All employers are urged by the President to refrain, after August 1, from recruiting unskilled labor in any manner except through this central agency. Only through strict compliance with the government's program can the constant, restless, shifting of labor from one war job to another, with the conseqent diminution in production and efficiency, be prevented.

Above all, the government urges every man engaged in war work to stick to his job until the government recommends that he change. Any man not engaged in war work should put himself at the disposal of the nation by registering with the public service reserve. The war worker ranks with the fighter in the trenches. He will help beat the Hun.

The government employment service has over 500 branches throughout the nation and 20,000 U. S. Public Service Reserve enrollment agents. Your local postoffice or newspaper can furnish you the name and address of the nearest representative.

Making the Motor Truck Patriotic by Eliminating Slackers.

Keeping that truck busy is just now something more than a mere matter of profit—it's a matter of patriotism as well. Motor trucks, whether they carry groceries or gunpowder, are *munitions of war*. Or, put it this way—every motor truck that loafs is a slacker.

Why is this? Once more it's the familiar problem of manpower. A three-ton truck is worth as much as half a dozen men. And when that truck is standing still, *needlessly*, not only is your able-bodied driver idle, but five or six men besides—a corporal's squad!

"How can I keep my trucks busy?" That's what thousands of truck owners are saying today. The problem is difficult, for the motor truck does most of its work out on the road, out of sight of human supervision.

Science has met this problem squarely by providing a mechanical means for recording the movements of motor trucks every minute of the day and night. The Service Recorder is the name of this little device; a sketch of it is presented in the accompanying illustration. It is just announced by the Service Recorder Co., of Cleveland, Ohio.

"Keep motor trucks busy," says Uncle Sam. "How?" asks the merchant.

"I'll show you," says this little mechanical historian, and right away it begins to jot down such facts as: when the truck reported for work, how long it

took to load, how long to make various trips, when each delay occurred and the length of each delay, how long it was held up at the freight station, or at the shipping dock, or in the yard, and many other interesting facts, including when the truck turned in at night, and whether it was used during the night.

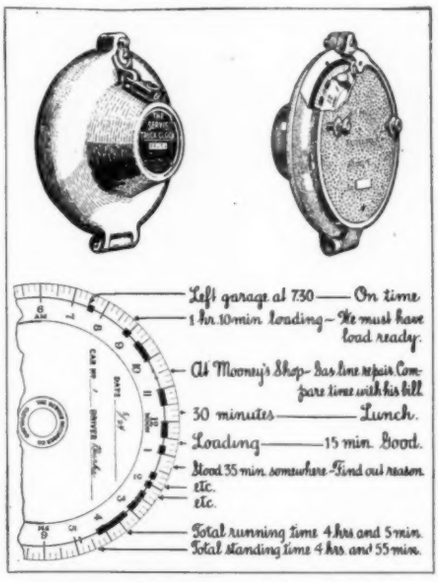
It gives this information every day on a little paper disk. This disk is laid on the desk of the dispatcher, superintendent, sometimes even the president of the company. And when he comes to glance over it, he finds out, wonderful to relate, that in nine cases out of ten, the driver is not to blame for expensive truck delays, but instead some department of the business. Then he gets busy and revamps his shipping department, puts in quick loading devices, arranges his routes on a scientific time schedule and perhaps saves an hour a day. And how much is that hour worth? More than $500 a year!

How does this ingenious little device work? Did you ever notice the motion of a street car coming toward you along a straight track? It sways from side to side, sometimes as much as four or five inches.

This side-sway is very pronounced in the motion of the motor truck. It is present no matter how smooth the road or how straight the line of travel. It is entirely distinct from vibration and should not be confused with it.

This side-sway then tells us that the vehicle—whether motor truck, horse-drawn wagon, locomotive, or even motorcycle—is in travel motion, and the absence of it indicates that the vehicle is standing. The problem, then, is to make an instrument which will not only record this side-sway, but record it when it happens.

The device pictured in the illustration consists of but two elements: First, a pendulum mass which will swing from side to side in response to the side-sway of the moving vehicle, and second, a chart rotating at clock speed, upon which the pendulum can mark a record which indicates that side-sway, and hence travel,


Left garage at 7.30 — On time
1 hr. 10 min. loading — He must have load ready.
At Mooney's Shop- Gas line repair. Compare time with his bill
30 minutes — Lunch.
Loading — 15 min. Good.
Good 35 min. somewhere. Find out reason.
etc.
etc.
Total running time 4 hrs and 5 min.
Total standing time 4 hrs. and 55 min.

Service Recorder and Its Chart.

is going on. Of course, the absence of this record shows that the vehicle is standing.

One more point: How does the pendulum record its oscillation on the chart? By means of a stylus that is set in the pendulum near its point of suspension.

An idea of the kind of record which is made by this device may be obtained from the fragment of the circular dial pictured. To a person not acquainted with the truck or vehicle in question, a chart of this kind seems to present merely a succession of periods of running and standing time. But the truck superintendent or dispatcher knows the work which the truck has to do, and finds no difficulty in identifying the various trips and stops, as shown in the chart already referred to. The next and obvious step is to cut down those delays which are not warranted, and thus increase the running time of the truck to a maximum.

While the commercial utility of this device is very apparent, it is possible that, during the war, its military use may be even more important. Anyone who is acquainted with military affairs knows that the average officer spends an important part of his time in making out reports of various kinds, giving a time record of his activities during the day.

Officers in charge of motor vehicles are generally required to make reports covering the movements of those vehicles, with special reference to exact periods of time in which the trucks, passenger cars, motorcycles, etc., are running, and standing, when they started and stopped, and the total running and standing time for the day and night. To assemble this information by human means is laborious and often inaccurate. This recording device, on the other hand, gives all this information accurate to the minute, and not only relieves the officer of the burden of getting this information but makes it possible for him to render much more accurate and complete records than would otherwise be practicable.

Record of Telephone Patents

1,270,277. June 25, 1918; filed March 17, 1910. TWO-WIRE AUTOMATIC AND MANUAL TELEPHONE EXCHANGE TRUNKING SYSTEM; 30 claims; E. D. Fales, La-Grange, Ill., assigned to Automatic Electric Co. In this system automatic switches extend the connection from the B operator's board to the called line. The B operator is provided with means for intermittently operating a visual signal on the A operator's board when the automatic switches attempt to make connection with a busy line.

1,270,326. June 25, 1918; filed December 13, 1916. CALL FINDER FOR AUTOMATIC AND SEMI-AUTOMATIC TELEPHONE SYSTEMS; five claims; J. N. Reynolds, Greenwich, Conn.; assigned to Western Electric Co. The feature of this call finder are stationary contacts, each common to one terminal in each set of movable terminals that is provided for each line. A rotatable shaft operates a mechanism for causing the engagement of a terminal in each set in succession with their common contact. Electromagnetic means associated with the shaft, cause the engagement of the other terminals in each set with the other common contacts respectively.

1,270,388. June 25, 1918; filed November 20, 1916. TELEPHONE EXCHANGE SYSTEM; four claims; B. G. Dunham, Hawthorne, N. J.; assigned to Western Electric Co. In this semi-automatic system an extended starter wire is provided for associating an idle finder switch with the telephone lines. A relay is associated with each finder for rendering its release circuit inoperative. The energization of any line relay causes the operation of the relays of the finder through which the starter wire is extended, while a slow relay prevents the closure of the energizing circuit.

1,270,465. June 25, 1918; filed September 13, 1916. AUTOMATIC SWITCHING MEANS; 10 claims; J. F. Toomey, New York; assigned to American Telephone & Telegraph Co. In this system of distribution, two batteries are serially connected and provided with a switching device for connecting a source of charging energy with either of the batteries. Each repeater of a number of vacuum tube repeaters has its positive electrode connected in multiple to the positive terminal of the direct current energy source. Relays, individual to the repeaters, connect the repeater filaments in multiple with either of the batteries when the other battery is being charged. A relay common to the repeater connects the negative terminal of the direct current energy source to that battery terminal to which the positive terminals of the filaments are connected.

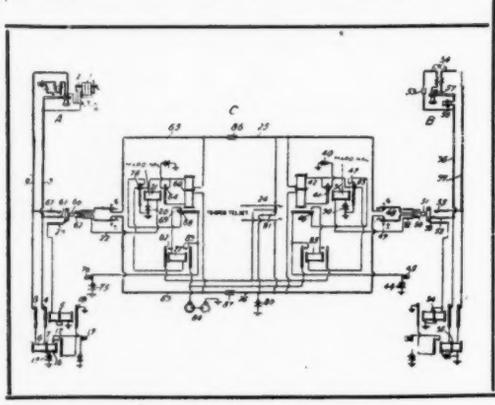
1,270,723. June 25, 1918; filed June 5, 1917. TELEPHONE SYSTEM; three claims; F. L. Goheen, Grouse, Idaho. A subscriber's set for lockout party line telephone systems is described. The feature of this set is a rod, an enlargement on which is adapted to pass through a peripheral notch on a disk so as to dispose the enlargement at the opposite sides of the disk when the latter is in a normal position. Energization of an auxiliary lead extending between the subscribers' sets operates mechanism at each subscriber's set for intermittently rotating the disk, whereby the notches are disposed out of alignment with the enlargement, thereby preventing the return of the

switch actuated, to its open position and preventing movement of the remaining switches to the closed position. Rotation of the disk operates mechanism for connecting the talking and listening circuits of the called subscriber only with the main lead.

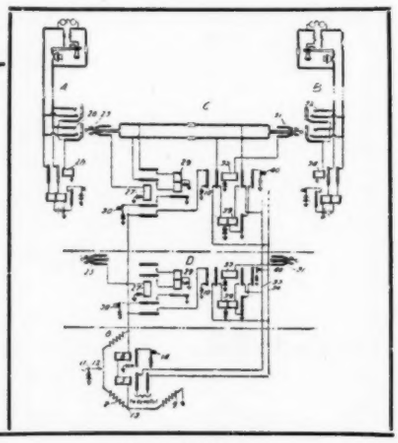
1,270,861. July 2, 1918; filed February 1, 1915. COMBINED TELEGRAPH AND TELEPHONE INSTRUMENT; 28 claims; H. G. Pape, New York, N. Y. A pneumatic impact diverting earpiece is connected to a telegraphic ticker for the private delivery of the telegraphic ticks to the ear of the listener. Adjustable means are provided for converting the ticker into a telephone sounder or articulate speech reproducer.

1,270,920. July 2, 1918; filed June 28, 1917. TRANSMITTER OR RECEIVER; K. Botz, New York, N. Y. A conical helix of conducting and magnetic material has one end fastened to a non-magnetic diaphragm, and the other end fixed. Provision is made for connecting the ends of the helix in an electric circuit and also for enveloping it in a magnetic field.

1,271,032. July 2, 1918; filed July 19, 1915. AUTOMATIC TELEPHONE SYSTEM; 131 claims; B. C. Groh, Chicago; assigned to Automatic Electric Co. In this automatic toll system automatic switches are placed at both ends of an interconnecting toll line between two exchanges



No. 1,271,171.



No. 1,271,322.

for establishing talking connections thereover in either direction. Means at each end of the toll line are provided for closing a control circuit of the automatic switches at the other end, the control circuit including the conductors of the toll line in parallel.

1,271,124. July 2, 1918; filed December 30, 1916. SWITCHING DEVICE; two claims; W. T. Booth, East Orange, N. J.; assigned to Western Electric Co. In this switchhook the actuating member is pivotally mounted upon the main portion of the bracket in operative relation to the free ends of the contact spring. Provision is made for mounting the bracket on the mounting plate with the actuating arm in a plane parallel with or at an angle to the plane of the mounting plate.

1,271,127. July 2, 1918; filed April 15, 1916. TELEPHONE SYSTEM; ten claims; W. G. Britten, Fanwood, N. J.; assigned to Western Electric Co. In this circuit electro-responsive means are provided for regulating the strength of the working current applied to the transmitting and receiving means associated with the line circuit.

1,271,133. July 2, 1918; filed August 1, 1917. TELEPHONE SYSTEM; 8 claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. The feature of this automatic system comprises registering devices associated with the selector switches and adapted to register the number of calls failing to secure service due to all the connectors apportioned to such calls being busy. Registering devices are also adapted to be associated with the busy connector switches for recording the number of calls extended to a group of subscriber's lines.

1,271,171. July 2, 1918; filed January 22, 1915. TELEPHONE SYSTEM; 11 claims; L. H. Johnson, Bloomfield, N. J.; assigned to Western Electric Co. The feature of this cord circuit for interconnecting common battery and magneto telephone lines, is a relay operating upon connection of the cord circuit with a common battery line and non-operative when connected to a magneto line. A second relay controlled over a line of either character, co-operates with the first relay when energized, to include a source of current in circuit with a signaling device to furnish a continuous signal. A third relay is actuated upon the energization of the second relay, when the first relay is de-energized, and co-operates with the first relay, when de-energized, to include the source of current and an interrupter mechanism in circuit with the signaling device to furnish an intermittent signal.

1,271,185. July 2, 1918; filed December 22, 1915. TELEPHONE EXCHANGE SYSTEM; 12 claims: A. E. Lundell, N. Y.; assigned to Western Electric Co. Equipment is jointly controlled through the calling and called lines for lighting a clearing-out signal, while other apparatus is operative, upon extension of the calling line to another called line, for lighting the signal under the sole control of the last-mentioned line.

1,271,186. July 2, 1918; filed November 13, 1916. TELEPHONE EXCHANGE SYSTEM; four claims; A. E. Lundell, New York; assigned to Western Electric Co. A variably operable switching device has a listening-in and a listening-out position and is moved into the listening-in position by apparatus which is responsive to the extension of a subscriber's line to an operator's trunk circuit. Manually operable means are provided for moving the device from the listening-in to the listening-out position, while operator-controlled means move it out of the listening-out position as does also subscriber-controlled means.

1,271,263. July 2, 1918; filed September 3, 1915. ELECTROMAGNET; two claims; C. F. Baldwin, Montclair, N. J.; assigned to Western Electric Co. A high-resistance winding on the controlling magnet of the operating magnets of a selector switch is arranged, when energized, to attract the armatures of the controlling magnet. The low-resistance winding on the controlling magnet is arranged, when energized, to retard the retraction of the armatures of the controlling magnets but is unable to attract or maintain the armatures attracted.

1,271,320. July 2, 1918; filed September 11, 1916. ELECTRIC CONDUCTOR; two claims; W. G. Houskeeper, Philadelphia, Pa.; assigned to Western Electric Co. A process for forming leading-in conductors is described. It consists in flattening spaced portions of a conductive wire, trimming the edges of the flattened portion, coating the wire with a fluxing agent and fusing it onto the wire. The wire is then separated into lengths, each of which includes one of the flattened portions. The fused fluxing agent is next removed from the ends of each length.

1,271,322. July 2, 1918; filed April 24, 1917. TELEPHONE EXCHANGE SYSTEM; 12 claims; C. W. Keckler, Newark, N. J.; assigned to Western Electric Co. The feature of this cord circuit is a Wheatstone bridge circuit having three arms connected with the cord circuits. A fourth arm for the bridge is connected therewith upon connection of one of the link circuits with one of the telephone lines. A switching device in the bridge is responsive to the connection of the fourth arm to the bridge to connect the operator's telephone set with the engaged cord circuit.

1,271,335. July 2, 1918; filed January 11, 1916. TELEPHONE EXCHANGE SYSTEM; six claims; A. E. Lundell, N. Y.; assigned to Western Electric Co. A busy-test arrangement is described to render the busy test circuit effective with respect to the operator's telephone receiver but ineffective with respect to the telephone line. Current transforming means in the busy test circuit induce a current in the operator's telephone receiver, while another current transforming means produces a current flow equal to that through the first transforming means but in the opposite direction. The second transforming means is connected in the circuit of the operator's receiver and the line and prevents the flow of current from the first transforming means over the line.

1,271,336. July 2, 1918; filed November 14, 1916. TELEPHONE EXCHANGE SYSTEM; five claims; A. E. Lundell, New York; assigned to Western Electric Co. In this semi-automatic system an indicating arrangement comprising electro-responsive devices, is timed to respond to currents of different frequencies. Manually-controlled means are operated to impress combinations of currents of different frequencies on a control circuit to operate the electro-responsive devices in different combinations.

1,271,337. July 2, 1918; filed September 30, 1916. TELEPHONE SYSTEM; 26 claims; A. E. Lundell, New York; assigned to Western Electric Co. In this automatic system a starting circuit for the automatic switches is controlled by one of the lines for starting the operation of the switch. Means, common to all the switches of a group, are provided for pre-selecting a number of the switches for successive operation.

1,271,378. July 2, 1918; filed June 19, 1913. NON-INTERFERING KEY; three claims; C. H. Smith, Chicago; assigned

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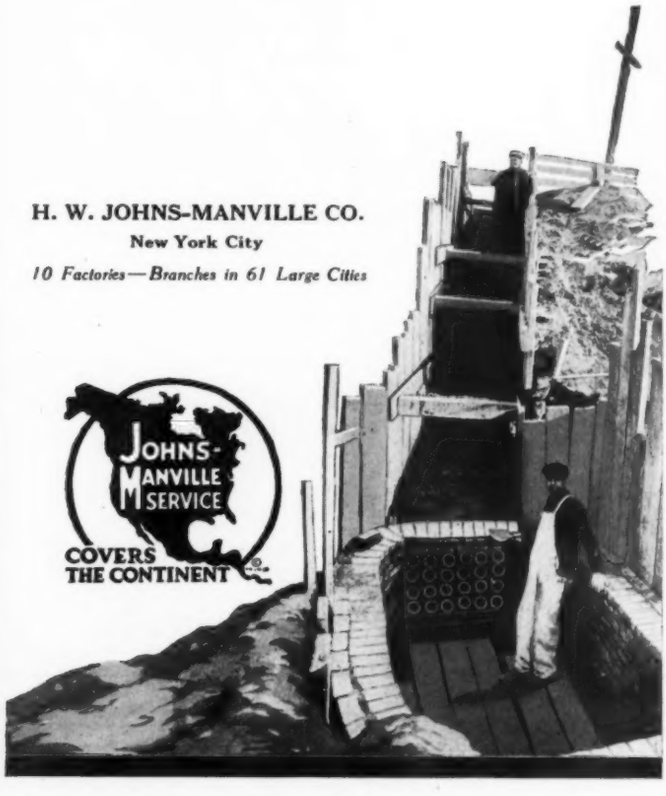

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1,271,824. July 9, 1918; filed June 30, 1916. TELEPHONE AND TELEGRAPH CABLE; five claims; G. A. Anderegg, Oak Park, Ill., and W. E. Mougey, Chicago; assigned to Western Electric Co. In this multi-conductor cable containing one or more quads, each quad consists of two pairs having relatively long lengths of twist, twisted helically about each other with a uniform length of lay less than that of one of the twisted pairs.

1,271,872. July 9, 1918; filed October 31, 1917. TELEPHONE CORD TAKE-UP; two claims: L. W. Eleyet, Lakeview, Ohio. A drum within a housing is operable to wind and unwind the flexible element extending through an opening in the housing. A train of gearing connects a spring in the housing and the drum to rotate the latter.

1,271,883. July 9, 1918; filed September 25, 1917. TELEPHONE SYSTEM; six claims; C. B. Fowler, New York; assigned to Western Electric Co. The feature of this cord circuit is a combined talking and testing conductor for engaging the test terminal of a jack to determine the idle or busy connection of the line. A listening key, when actuated, connects a resistance coil in the combined talking and testing conductor and connects a busy-test relay with the testing conductor in parallel relation to the resistance coil.

1,271,897. July 9, 1918; filed February 20, 1917. TELEPHONE EXCHANGE SYSTEM; seven claims; E. E. Hinrichsen, New York; assigned to Western Electric Co. In this cord circuit a relay operates upon connection of the circuit with a calling line and its operation actuates another relay. The locking circuit for this last-mentioned relay includes a winding of the first relay established upon the operation of the first relay and the supervisory relay. A source of intermittent current is brought into circuit with the signaling device upon the subsequent de-energization of the second relay and the energization of the supervisory relay.

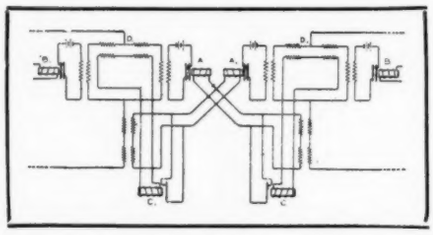
1,271,924. July 9, 1918; filed November 17, 1916. ELECTROMAGNETIC SWITCHING DEVICE; three claims; D. D. Miller, New York; assigned to Western Electric Co. The core of this relay has a bifurcated pole piece which is in juxtaposition to the free end of a U-shaped armature that is flexibly mounted on a core extension and extending substantially parallel with the core.

1,272,022. July 9, 1918; filed November 8, 1916. TWO-WAY REPEATER CIRCUITS; 14 claims; M. M. Dolmage, Washington, D. C. Two telephone repeaters are placed at each repeating station and each arranged for one-way repeating but in opposite direction, respectively, to the telephone system but both being normally in full repeating relation to the system. Voice-actuated circuit making-and-breaking devices control circuit-changing apparatus for rendering inoperative that repeater which is arranged for repeating in a direction opposite to the direction of transmission from the talking to the listening stations.

1,272,221. July 9, 1918; filed December 13, 1916. TELEPHONE EXCHANGE SYSTEM; 14 claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. Signaling arrangements between switchboards are described. Switching means are controlled by the operator at the first central office for determining the side of the line over which signaling current from the second central office is to be projected.

1,272,279. July 9, 1918; filed August 16, 1916. CIRCUIT INTERRUPTING DEVICE; five claims; A. E. Lundell, New York; assigned to Western Electric Co. Provision is made for establishing an interconnection between a number of interrupting devices such that the circuit will continue to be interrupted while any or all of the interrupting devices are in operation.

1,272,280. July 9, 1918; filed October 6, 1916. TELEPHONE SYSTEM; 16 claims; A. E. Lundell, New York; assigned to Western Electric Co. In this system a normally-resting switching device is common to the signaling means of the telephone lines. Apparatus controlled by



No. 1,272,022.

the switching device simultaneously controls the actuation of a number of the signaling means in a manner characteristic for a number of calling lines.

1,272,282. July 9, 1918; filed November 20, 1917. TELEPHONE EXCHANGE SYSTEM; six claims; J. L. McQuarrie, Montclair, N. J.; assigned to Western Electric Co. In this automatic switching device a number of sections are arranged in superimposed tiers, each tier being provided with an upper and a lower contact-bearing surface. Each of the surfaces comprise a separate group of multiple terminal strips. Provision is made for causing vertical motion of a switching mechanism to select a desired group of contacts and a rotary movement to select a desired contact in a selected group.

1,272,402. July 16, 1918; filed October 10, 1917. ELECTROMAGNETIC SWITCHING DEVICE; eight claims; H. C. Egerton, Passaic, N. J.; assigned to Western Electric Co. The armature of this relay is adapted to vibrate with increasing excursion upon the energization of the electromagnet and to intermittently interrupt such energization of the electromagnet. Provision is made for retaining the armature in a fixed actuated position upon obtaining a certain amplitude of vibration which may be predetermined.

1,272,413. July 16, 1918; filed June 13, 1917. TELEPHONE MOUTHPIECE; six claims; M. C. Frederickson, Cameron, Wis. This mouthpiece is constructed of flexible material capable of being readily destroyed. It is made in the form of a cone with a rectangular perforated disk secured to the smaller end. A holder is provided for receiving the disk and attaching the mouthpiece to the transmitter.

1,272,624. July 16, 1918; filed March 21, 1917. TELEPHONE EXCHANGE SYSTEM; seven claims; R. D. Conway, Chatham, N. J.; assigned to Western Electric Co. An electromagnetic switching device connects signaling current to a line and operates under the control of the commutator in response to the connection of the cord circuit with a line. Motor mechanism for actuating the commutator is started upon the operation of the electromagnetic switching device.

1,272,641. July 16, 1918; filed July 24, 1916. TELEPHONE SYSTEM; 13 claims; H. C. Egerton, Passaic, N. J.; assigned to Western Electric Co. In this system, loud-speaking receivers are arranged in subdivided groups adapted to be actuated by amplifiers. Provision is made for predetermining the relative volume of sound produced by each of the receivers comprising any of the subdivisions of the group as compared to the relative volume of sound produced by each of the receivers comprising other subdivisions of the group.

1,272,673. July 16, 1918; filed April 14, 1915. SERVICE-OBSERVING CIRCUIT FOR TELEPHONE LINES; eight claims; C. W. Keckler, Newark, N. J.; assigned to Western Electric Co. In this service-observing circuit connected with the talking conductor of the line circuit, a relay is energized upon the removal of the receiver from the switchhook for causing the operation of a service-observing signal. Another relay causes the effacement of the signal.

1,272,689. July 16, 1918; filed July 2, 1917. TELEPHONE EXCHANGE SYSTEM; 12 claims; H. W. McDougall, East Orange, N. J.; assigned to Western Electric Co. The cord circuit at the central office comprises a pair of normally-open talking conductors a relay bridged across them. The relay is energized upon the connection of the cord circuit with the telephone line when the latter is open and is not energized when the line is closed. Another relay operates upon the connection of the cord circuit with the telephone line for including interrupter mechanism in circuit with the signaling device to cause intermittent operation thereof when the bridged relay is not energized.

1,272,692. July 16, 1918; filed March 2, 1917. TRANSMITTER SUPPORT; six claims; G. E. Mather, East Orange, N. J., and B. Bailey, New York; assigned to Western Electric Co. A U-shaped arm has its legs pivoted to a base member while a second U-shaped arm has its base pivoted with the first arm. A telephonic transmission element is mounted between the legs of the second arm, the first arm being broader than the second so that the latter may be positioned within it.

1,272,993. July 16, 1918; filed December 26, 1914. SPEAKING AND SIGNALING APPARATUS; 13 claims; H. G. Pape, New York. The feature of this patent is a hand telephone comprising electro-responsive sound-transforming mechanism across which is a normally-open shunt. Means are provided to automatically establish a circuit through the shunt and through the transforming mechanism when external pressure on the hand telephone is removed by removing the telephone from its support, and to open the circuits when pressure is applied by restoring the telephone to its support. The telephone receiver comprising a signaling device in the circuit, is controlled by the switch.

1,273,154. July 23, 1918; filed June 15, 1917. RELAY SELECTING CIRCUIT FOR ARTIFICIAL LINES; six claims; C. S. Demarest, Flatbush, New York; assigned to American Telephone & Telegraph Co. A repeater provided for connecting a

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number of telephone transmission lines, has a number of artificial lines associated with it, one of these artificial lines being normally connected to the repeater. Mechanism operating in response to the connection of the repeater to a transmission line, disconnects the artificial line and connects another artificial line to the repeater.

1,273,158. July 23, 1918; filed July 14, 1917. HEAT-COIL PROTECTIVE DEVICE FOR ELECTRIC CIRCUITS; four claims; L. E. Dickinson, Boonton, N. J.; assigned to Western Electric Co. This device comprises a metal sleeve having a pin passing through it secured by a heat-softenable material, and a heating element surrounding a portion of the sleeve. This is composed of a nickel alloy having a temperature coefficient of more than 0.0018 per degree Centigrade, which is adapted to be connected in the circuit.

1,273,189. July 23, 1918; filed November 27, 1914. TELEPHONE SYSTEM WITH AUTOMATIC RINGING DISCONNECT; 22 claims; F. Schoenwolf, Chicago; assigned to Kellogg Switchboard & Supply Co. Apparatus is provided for applying and continuing under control of the operator, ringing current to the called line. The ringing current may be interrupted by a control exercised at both the calling and called substation.

1,273,245. July 23, 1918; filed September 11, 1916. ELECTROMAGNETIC SWITCHING DEVICE; A. E. Lundell, New York; assigned to Western Electric Co. A nonconductive oscillating disk is pivotally supported on one end and on a pivot transverse to the axis of the core of the electromagnet. A number of contacts and an armature are carried by the disk while a number of contact springs cooperate therewith, extending parallel to the axis of the core.

1,273,247. July 23, 1918; filed December 2, 1916. AUTOMATIC SWITCH; seven claims; F. A. Lundquist, New York; assigned to Western Electric Co. The ends of certain contacts insulatively separate from each other on contact strips, are arranged to serve as the contacting portions, while the sides of other of the contacts are arranged to serve as the contacting portions. Provision is made for supporting the contact strips in fixed relation.

1,273,274. July 23, 1918; filed May 25, 1916. TERMINAL BANK; four claims; J. N. Reynolds, Greenwich, Conn., and O. F. Forsberg, Yonkers, N. Y.; assigned to Western Electric Co. In this switch bank clamping plates are provided with laterally-extending lugs having apertures. Insulatively-separated contact strips are mounted between the clamping plates, each of the contact strips being provided with laterally-extending contacts. Tie rods extend through the lugs for holding the plates in fixed relation.

1,273,351. July 23, 1918; filed July 20, 1916. TELEPHONE RECEIVER; 13 claims; H. A. Frederick, Hackensack, N. J.; assigned to Western Electric Co. In this receiver a diaphragm of magnetic material is clamped at its periphery and so proportioned that a damping constant, as defined by the resistance divided by twice the mass, equal to 500 or more C.G.S. units, is obtained when the receiver is held closely to the ear of the user.

1,273,722. July 23, 1918; filed October 5, 1917. ROLLING TELEPHONE DIRECTORY; two claims; M. Blatt, Detroit, Mich.; assigned to Anna Blatt, Detroit. This device consists of a bracket arranged for attachment to a transmitter of a desk stand. A spring-actuated roller has swiveling connection intermediate its ends with the bracket so that it may be rotated to present the reverse side of a webb carried thereon for observation.

1,273,850. July 30, 1918; filed April 27, 1916. SELECTOR CIRCUIT FOR AUTOMATIC AND SEMI-AUTOMATIC TELEPHONE SYSTEM; eight claims; C. L. Goodrum, New York; assigned to Western Electric Co. The feature of this patent is a combination of fast and slow relays for controlling the actuation of automatic switching means. A resistance is inserted in the circuit of one of the relays to prevent the actuation of the switching mechanism for a predetermined interval after it has been selected for use.

1,274,001. July 30, 1918; filed September 29, 1916. EXTENSIBLE BRACKET; six claims; P. C. Burns, Chicago. This is an improvement of the well known Burns bracket for holding desk stands. The feature consists of a spring secured to the inner end of the bracket and operated to counterbalance the force exerted on the bracket by the supporting member.

1,274,128. July 30, 1918; filed October 8, 1917. TELEPHONE ATTACHMENT; five claims; J. E. Williamson, Evansville, Ind. A desk stand having in its standard a device for winding up the slack of the cord, is described. The cord passes into the standard near the base of the stand and is wound upon a hub rotatable in the base.

1,274,357. July 30, 1918; filed May 19, 1906. AUTOMATIC TELEPHONE EXCHANGE SYSTEM; 25 claims; H. L. Fish, Bakersfield, Cal.; assigned to Automatic Electric Co. The feature of this automatic system consists of line relays for the automatic switching apparatus which have windings in the release circuit associated with the talking circuit and windings connected to the talking circuit, the windings in the release circuit being in series.

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